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Restricted democracies

Nuclear weapons programs, secrecy, and democracy in the United Kingdom, France, and Sweden (1939-1974)

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Studying secrecy was not my original plan. I originally wanted to work on luck, and it is how I ended up meeting Benoît Pelopidas to whom I owe so much that a few lines will not suffice. Meeting him was life changing. He encouraged me to take risks, think big, and be rigorous. I do not know if this dissertation fits these standards, but I am certainly glad to have had him supervising it. With him, I learned more that I could have hoped for. He managed to create an inspiring and intellectually challenging space to study nuclear weapons in France, and I am glad to have been a part of the *Nuclear Knowledges* journey. Inadvertently, he also taught me a lot about cinema. This part might not have been originally planned, but I am glad it happened. Most importantly, I am thankful to him for believing in me and giving the confidence I needed.

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As I am reaching the end of these acknowledgments, it is usually the moment when they become more personal. A small comment is in order. Academia is a wonderful place, but it is a stressful and challenging one. Mental health issues are all too common, and particularly among Ph.D. students – especially after the lockdown.[1] These are not ignored – in fact, they are one of the most common academic joke. But perhaps we should take them more seriously. In any case, I would like to thank the team at the Bureau d'Aide Psychologique Universitaire Pascal, who helped me greatly when I needed it the most.

And, finally, thanks to those dear to me who were there during these years. Thanks to Alexandre, for his constant monitoring of international affairs, Augustin and Jean Hugues, with whom I discovered nuclear strategy playing *Civilization*, and Mathieu, who even travelled through Europe just to see me finishing this dissertation! Last, but certainly not least, thanks to Gwladys for her love and support. I promise, I should talk (slightly) less about secrecy in the years to come.

[1] See Jérémy Gaudel et al., "Impact du confinement sur la santé mentale des doctorants, une étude de cohorte dans une université française," *L'Encéphale*, April 2023, S0013700622002627; Jeanne Boisselier et al., "Vulnérabilité Sociale et Santé Mentale : Quand Les Doctorants Sont Mis à Mal:," *Nouvelle Revue de Psychosociologie* 33, no. 1 (May 5, 2022): 167–82. Am I even allowed to cite academic papers in my acknowledgments? I do not know; I will keep you updated.

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List of abbreviations

AEC: US Atomic Energy Commission

AMAE: Archives du Ministère des Affaires Etrangères (French Foreign Ministry Archives)

AN: *Archives Nationales* (French National Archives)

AK: *Atomkommité* (Swedish Atomic Energy Commission)

ASIO: Australia Security Intelligence Office

AWRE: UK Atomic Weapons Research Establishment

AWTSC: Atomic Weapons Tests Safety Committee

BEG: *Bureau d'Etudes Générales* (Bureau for General Studies)

CEA: *Commissariat à l'Energie Atomique* (French Atomic Energy Commission)

CEP: Centre d'Expérimentations du Pacifique (Pacific Experiments Center)

CHSP: Centre d'Histoire de Sciences Po

DAM: *Direction des Applications Militaires* (CEA Department for Military Application)

DIRCEN: DIRection des Centres d'Essais Nucléaires (French Nuclear Test Site Direction)

DSPS: *Département pour la Sécurité et la Protection du Secret* (CEA Department for Security and the Protection of Secrecy)

DST: *Direction de la Surveillance du Territoire* (French Directorate for Homeland Security)

DTN: Direction des Techniques Nouvelles (Direction for New Technics)

FRUS: Foreign Relations of the United States

HER: High Explosive Research

HSS: Historical Sociology of the State

KA: *Krigsarkivet* (Swedish Military Archives)

MAD: Mutually Assured Destruction

MoD: Ministry of Defence

MoS: Ministry of Supply

NATO: North Atlantic Treaty Organisation

NOTAM: Notice To AirMen

OSRD: Office for Scientific Research and Development

PTBT: Partial Test Ban Treaty

RA: *Riksarkivet* (Swedish Royal Archives)

SCPRI: Service Central de Protection contre les Radiations Ionisantes (French Central Service for Radiation Protection)

S-DMICC: State-Defense Military Information Committee

SHD: Service Historique de la Défense

SKI: *Svensk KärnkraftInspektion* (Swedish Nuclear Power Inspectorate)

SMSR: *Service Mixte de Sécurité Radiologique* (French Mixed Service for Radiological Safety)

STS: Science and Technology Studies

TNA: The National Archives

UK: United Kingdom

UN: United Nations

UNAEC: United Nations Atomic Energy Commission

Table and figures

Introduction: The nuclear-democratic question.

"Nuclear weapons are everything and nothing. This is their genius. On the one hand, they are bargaining chips, pawns in a propaganda contest, peace-keepers — mutually cancelling, a double bluff we all go along with. They are nothing. How can anyone get hurt by an 'umbrella'? On the other hand, nuclear weapons are what they are and do what they do: they multiply matter by the speed of light squared; they deal in tons of blood and rubble; they are instruments of mass destruction. They are everything, because they can destroy everything. It's just as well, for their sake, that they sometimes look like nothing."

Martin Amis, "Nuclear Cities: the Megadeath of Intellectuals", in *Visiting Mrs. Nabokov and Other Excursions* (New York: Harmony Books, 1994), 6.

Just a few months after the explosion of the first atomic bombs over the cities of Hiroshima and Nagasaki, novelist and journalist George Orwell was pondering the historical consequences of humanity's entry into the atomic age. His perspective was bleak. Not only was he worried that the recent invention of the atomic bomb would change the face of relations between states – by freezing them in a "cold war" – he also feared that the new technology would distort relations between states and their people. Laying out a general history of the relation between popular emancipation and weaponry – "the "great age of democracy and of national self-determination was the age of the musket and the rifle" – Orwell theorized that nuclear weapons, because they could only be developed by powerful actors, would only "make the strong stronger" and "[rob] the exploited classes and peoples of all power to revolt", thereby harming democracy.[1] The invention of nuclear weapons, he argued, was not simply changing the world, it was also changing states. More than this, it was menacing democratic government.

Orwell was not along in thinking along these lines. In the United States, Orwell's socialist ideas were not widely shared, but his anxiety crossed political boundaries. Considering the danger posed by nuclear weapons, some wondered what kind of institutions were necessary to save democracy from nuclear war. Clinton Rossiter feared that, in case of war, "the absolute weapon will have brought us absolute government" and proposed various possibilities for a continuity of congressional power in case of an atomic destruction of Washington.[2]. A young Robert Dahl also expressed concern about the possibility

[1] George Orwell, "You and the Atom Bomb," *Tribune*, October 19, 1945, https://www.orwellfoundation.com/the-orwell-foundation/orwell/essays-and-other-works/you-and-the-atom-bomb/.
[2] Clinton Rossiter, "Constitutional Dictatorship in the Atomic Age," *The Review of Politics* 11, no. 4 (October 1949): 398; Clinton Rossiter, "What of Congress in Atomic War?," *Political Research Quarterly* 3, no. 4

of combining nuclear weapons and democracy. He feared that "in a world environment transformed by new techniques of violences", democratic institutions might not be viable.[3] Like Orwell, he equated the age of the rifle with emancipation, and feared that the atomic age might be its opposite: "If the nineteenth century, politically speaking, was the era of multiple opportunities, the twentieth century by stark contrast is the day of the single chance".[4] What of "democracy in the atomic age", wondered Arnold Toynbee a few years later.[5]

Seven decades after those writings, concerns about nuclear weapons transforming the democratic state seem to have withered, leading to a general assumption of their absence. The question of nuclear weapons' impact on democratic states as such has not attracted much interest following the mid-1950s. A recent review of the field noted that the impact of nuclear weapons on a state's domestic politics remained a glaring blind spot in scholarship.[6] Instead of looking for the effects of nuclear weapons on domestic politics, nuclear security studies have looked the other way around and explored the effects of domestic politics on nuclear weapons.[7] The question of how nuclear weapons affect human societies has been the object of some attention in anthropology.[8] However, this work focuses mainly on the United States and has not sought generalizable theoretical conclusions. Similarly, works on civil defense have outlined how the threat of nuclear war affected state development,[9] but civil defense is not specific to

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(December 1, 1950): 602–6. Political scientist Arthur Bromage also devoted several articles to imagining forms of local administration which could do precisely that. Arthur W. Bromage, "Public Administration in the Atomic Age," *The American Political Science Review* 41, no. 5 (October 1947): 947–57; Arthur W. Bromage, "Total War and the Preservation of Democracy," *The Annals of the American Academy of Political and Social Science* 249 (January 1947): 66–74.

[3] Robert A. Dahl, *Congress and Foreign Policy* (New York: Harcourt, Brace & Company, 1950), 249.

[4] Dahl, 88.

[5] Arnold Toynbee, *Democracy in the Atomic Age : The Dyason Lectures, 1956* (Oxford: Oxford University Press, 1956).

[6] Erik Gartzke and Matthew Kroenig, "Nukes with Numbers: Empirical Research on the Consequences of Nuclear Weapons for International Conflict," *Annual Review of Political Science* 19, no. 1 (May 2016): 409.

[7] For an overview of the field on domestic politics and nuclear politics, see Elizabeth Saunders' recent essay whose title is indicative of how current research perceives the direction of the relation between the two. Elizabeth N. Saunders, "The Domestic Politics of Nuclear Choices—A Review Essay," *International Security* 44, no. 2 (October 2019): 146–84.

[8] Joseph Masco, *The Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Princeton: Princeton University Press, 2006); Joseph Masco, *The Theater of Operations: National Security Affect from the Cold War to the War on Terror* (Durham: Duke University Press, 2014); Hugh Gusterson, *People of the Bomb: Portraits of America's Nuclear Complex* (Minneapolis: University of Minnesota Press, 2004).

[9] Andrew D. Grossman, *Neither Dead nor Red: Civilian Defense and American Political Development during the Early Cold War* (New York: Routledge, 2001); Matthew Grant, *After the Bomb: Civil Defence and Nuclear War in Britain, 1945-68* (Basingstoke, UK; New York: Palgrave Macmillan, 2010); Edward Geist, *Armageddon*

nuclear armed states, and not specific to the nuclear threat either.[10] Given this gap, this dissertation aims to reconnect with the early debates of the nuclear age, and to shift domestic politics from the position of *explanans* to *explanandum*. Focusing specifically on democratic states, it asks: how have nuclear weapons affected the democracies that sought to acquire them?

1. The nuclear-democratic question: framing the problem.

Nuclear weapons have a complicated relationship with democratic government because their core characteristics are at odds with democratic conceptions of the state. They are, Daniel Deudney writes, "intrinsically despotic", and this for three reasons: "the speed of nuclear use decisions; the concentration of the nuclear use decision into the hands of one individual; and the lack of accountability stemming from the inability of affected groups to have their interests represented at the moment of nuclear use."[11] These facts have not escaped political philosophers, such as Elaine Scarry, who concludes that the United States is not a nuclear-armed democracy but a "thermonuclear monarchy" where the president possesses power of life and death over its entire population, and over the populations of other countries as well.[12] This radical conclusion is not reached by all, but also mainstream scholars in security studies have noted that nuclear weapons governance is characterized by a "deficit of democracy".[13]

Considering this, it appears important to formulate the "nuclear-democratic question", that is: are the political arrangements necessary to govern nuclear weapons compatible with democratic government?

Insurance: Civil Defense in the United States and Soviet Union, 1945-1991, (Chapel Hill: The University of North Carolina Press, 2019).

[10] See, for examples of civil defence policies in non-nuclear armed states, Marie Cronqvist, Rosanna Farbol, and Casper Sylvest, eds., *Cold War Civil Defense in Western Europe. Sociotechnical Imagineries of Survival and Preparedness* (London: Palgrave Macmillan UK, 2022).

[11] Daniel Deudney, *Bounding Power: Republican Security Theory from the Polis to the Global Village* (Princeton: Princeton University Press, 2007), 255. It must be noted that it is not always individual. In France, the decision rests in the hands of three persons (see Benoît Pelopidas, "France: Nuclear Command, Control and Communications," NAPSNet Special Reports (Nautilus Institue, June 10, 2019), https://www.tech4gs.org/nc3-systems-and-strategic-stability-a-globaloverview.html.). Moreover, the requirement of speed is less clear-cut than it seems. Indeed, if a country' second-strike capability is ensured by undetectable nuclear submarines, then there does not exist a need for immediate action since the second-strike is ensured for as long as those submarines remain undetectable. The need for immediate answer only exists if damage limitation is possible. For France, or the UK, this is not the case. I would like to thank Benoît Pelopidas for raising this interesting point.

[12] Elaine Scarry, *Thermonuclear Monarchy: Choosing between Democracy and Doom* (New York: W.W. Norton & Company, 2014), 24–27.

[13] Hans Born, Bates Gill, and Heiner Hänggi, eds., *Governing the Bomb: Civilian Control and Democratic Accountability of Nuclear Weapons* (Oxford: Oxford University Press, 2010), 230.

The nuclear democratic question, at the most basic level, asks whether nuclear weapons can be democratically governed, and what consequences a negative answer has for our understanding of democracy in nuclear-armed states. To answer it, I focus on the ways in which the pursuit of nuclear technology affects the political arrangements of democratic states and affects the ability of the public to exert control over state actions. Simply put, a democratic state is a state whose mode of government fits basic criteria for democracy, notably in terms of democratic control over state actions.[14] Specifically, I aim to answer the following research question:

How does the process of nuclear weapons pursuit and possession affect modes of democratic control inside democratic states?

In this dissertation, I argue that the pursuit of nuclear weapons is not merely a process of technological development or weapon procurement. Drawing on materialist approaches within Science and Technology Studies, conceptualizing technologies as partially agentic structures constitutive of social life through the creation of political constraints and opportunities,[15] I argue that the pursuit of nuclear weapons is also *a process of political change* through which technology imposes its constraints on actors, affects state structures and restricts the field of democratically decidable choices. I term this process "*nuclearization*". Acquiring nuclear weapons changes the nature of democratic government, producing *restricted democracies*, regimes which satisfy most of the criteria for democratic government, but where the state's ability to exert extreme violence at a global scale remains out of democratic control, meaning that citizens are restricted from truly governing themselves. The trouble is not that nuclear weapons are not democratically governed, but that they *cannot* be democratically governed. Nuclear weapons, I argue, affect the entire structure of democratic states. To make this case, I chose to focus on how the pursuit of nuclear weapons lead to the development of nuclear secrecy regimes, and how these

[14] According to Robert Dahl, these criteria are: a control over policy decision exerted by elected officials; fair and regular elections; (quasi-)universal right to vote; (quasi-)universal right to compete for office; freedom of expression; freedom of information and freedom of information. Robert A. Dahl, *Dilemmas of Pluralist Democracy: Autonomy vs. Control* (New Haven: Yale University Press, 1982), 10–11.
[15] See Katja Lindskov Jacobsen and Linda Monsees, "Co-Production. The Study of Productive Process at the Level of Materiality and Discourses.," in *Technology and Agency in International Relations.*, ed. Marijn Hoijtink and Matthias Leese (London: Routledge, 2021), 24–41.

regimes eventually affected democratic control over policy, in the UK, France, and Sweden between 1939 and 1975.

2. The nuclearization of democratic states: Summary of the argument.

To determine how the pursuit of nuclear weapons affects democratic government, I chose to look, first, at how nuclearization has affected state structures and, second, at whether the newly formed or transformed structures allowed for public control over state actions. By democratic government, I refer to the mode of government inside a given state – a state is a democratic state if it is democratically governed. The starting point is that because democratic government inside a state depends on the nature of its structures – the "institutional configuration in which political actors operate"[16] – assessing how nuclearization has affected those structures allows an assessment of its effects on democratic government. To do so, I focus on the development of nuclear secrecy regimes as an outcome of nuclearization. My argument is that the security implications of nuclear technology ineluctably create structural constraints for state actors, pushing them to develop secrecy regimes that in turn undercut any possibility for meaningful democratic control. Because secrecy interacts with modes of democratic control, these regimes prevent the public from exerting proper control over nuclear issues, erecting barriers around a specific – and crucial – domain of state action, meaning that democratic government inside the nuclear state can only be structurally restricted.

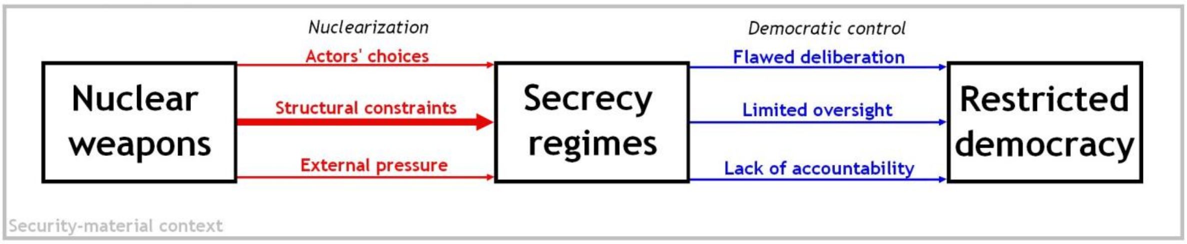

Figure 1 - Summary of the argument

Rather than a causal narrative, I am interested in writing a constitutive one, which aims at studying how nuclearization constituted democratic states in ways that restricts democratic control. A causal narrative

[16] Tuong Vu, "Studying the State through State Formation," *World Politics* 62, no. 1 (January 2010): 150.

would focus on what are the causes of restricted democracies and identified nuclear pursuit as one among other possible variables. What I am looking for, by contrast, is not a general narrative on the causes of democratic restrictions, but to understand how nuclear weapon pursuit can lead to the constitution of specific political arrangements which restrict democratic government. I argue that nuclear-armed democracies were constituted the way they were because of nuclearization, not that nuclearization was the general cause of restrictions to public control in democratic states.

However, constitutive narratives are not hostile to the quest for causality. As Patrick Thaddeus Jackson argues, "'constitutive' questions are causal questions, since underlying dispositions and properties of objects are causal properties." My constitutive account of nuclearization seek to find out how the structures of democratic states are put together as a result of the underlying properties of certain objects, which can be identified as the causes of the peculiar disposition of those structures. For this reason, I adopt the language of causality to determine why nuclear secrecy regimes were constituted and what effects they had on democratic government.

The primary variable I focus on is the *structural constraints* created by nuclear technology. I argue that the exceptional nature of nuclear arms creates structural constraints on actors who must account for the security implications of nuclear weapons' existence. In a world where nuclear weapons have been invented, the "destruction possibility frontier" has been fundamentally altered and this material context transforms the environment of actors.[17] Simply, those involved in a nuclear game are obliged to confront the prospect of the destruction of their state over the course of an afternoon. That said, what these constraints produce is not technologically determined, but mediated by the "*security-material context*" which is determined by the kinds of restraints over nuclear violence that exists.[18] The invention of nuclear weapons do not have the same implications if an international control over atomic energy exists

[17] Deudney, *Bounding Power*, 296, fn. 46.
[18] On the influence of the security-material context over actors, I refer to Daniel Deudney, "Geopolitics as Theory: Historical Security Materialism," *European Journal of International Relations* 6, no. 1 (March 2000): 77–107.

than if it does not, since an international control can offer strong forms of restraints against nuclear violence.

I argue that nuclear weapons inescapably invite the construction of expansive regimes of secrecy. The imposition of regimes of secrecy allows nuclear-armed states to limit both the spread of nuclear weapons and competitors' access to sensitive information about nuclear sites, plans, and weapons deployments and, by extension, one's vulnerabilities. As Barry Buzan observes, "because deterrence is influenced by technological variables, it cannot escape being vulnerable to the continuous pressure of qualitative advance".[19] For states practicing nuclear deterrence, there exists a need to safeguard any technological advance via secrecy – that is, via practices of information control designed to "keep other people from obtaining information you do not want them to have".[20] I do not mean to suggest that "survivability" is impossible to achieve, but rather that complete certainty of survivability is almost impossible to attain over the long term. For this reason, secrecy becomes necessary, at any rate as long as meaningful international control of the atom remains out of reach.

The kinds of structural constraints or incentives described above are not the only mechanisms leading to the development of secrecy regimes. In chapter three, I show that two other mechanisms must be considered. One is the *diplomatic pressures* exerted by the hegemon (i.e., the United States) to prevent the spread of nuclear technology and keep its technological edge. The other is the *domestic choices* made by actors, determining the maximal boundaries of nuclear secrecy regimes. If the structural constraints explain *why* secrecy regimes developed, they do not fully explain *how* they developed and what nuclear secrecy ended up encompassing. For example, no forms of inherent technological constraints can explain why the British, French, and Swedish nuclear programs were kept secret from those states'

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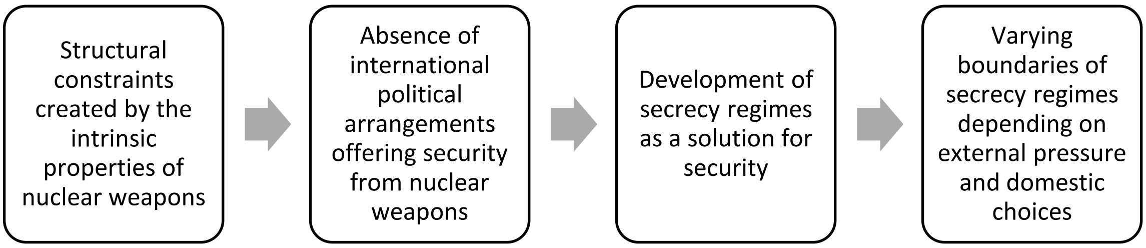
[19] Barry Buzan, *An Introduction to Strategic Studies: Military Technology and International Relations* (Basingstoke: Macmillan, 1989), 216.
[20] Secrecy, notes Wilsnack, is only one mode of information control. Other exists, such as persuasion or deception. But those modes of information control are not necessarily exclusive with secrecy. Overflowing an adversary with false information to deceive him, for example, is only a way of preventing him from accessing the one "true" information you wish him not to have. Therefore, deception or information overflow are modalities of information control, but they could not offer the security that secrecy promised. Richard W. Wilsnack, "Information Control: A Conceptual Framework for Sociological Analysis," *Urban Life* 8, no. 4 (January 1980): 471.

respective populations. Only concerns over potential domestic contestation can explain that. The development of nuclear secrecy regime can therefore be summarized as such:



The problem, for democratic states, is that secrecy produces various mechanisms that directly affect the ability of the public to control state actions. It creates *restrictions* to democratic control. Secrecy regimes can exclude the public from decision-making, limiting the knowledge of a given policy to a small number of officials. It can also distort the information given to the public about certain actions that state officials intend to carry out, muddying their costs or obfuscating their actual justifications. Finally, secrecy also facilitates denial, fostering public secrets not to be spoken of.[21] Therefore, effective control over past, present and future state actions is made impossible by the necessity of nuclear secrecy. I argue, therefore, that nuclear weapons produce *restricted democracies*, where parts of the state are structurally out of the citizens' reach, fundamentally undermining the public's ability to govern itself by limiting citizens' ability to properly control the level of violence their state is ready to exert on their behalf.

Does that mean that the political arrangements necessary to govern nuclear weapons are incompatible with democratic government? After all, the nuclear-armed states investigated in this dissertation have not entirely ceased to be democratic because of nuclear weapons. They still hold elections, parliaments vote on bills, citizens can contest policy decisions. However, the nuclear state seems to form a state within the state, out of the public's reach. The question might be posed as such: are the restrictions created by nuclear technology flies in the ointment or cockroaches in the soup? In his book on *Compromise and rotten compromises*, philosopher Avishai Margalit proposes this colorful metaphor to distinguish between situations whereby "rotten" elements spoil the entirety or only a portion of a given

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[21] Anthropologist Michael Taussig famously defined the public secret as the act of "knowing what not to know". Michael T. Taussig, *Defacement: Public Secrecy and the Labor of the Negative* (Stanford: Stanford University Press, 1999), 2.

object. While flies in the ointment can simply be removed, "the best soup is totally spoiled by even one cockroach".[22]

I argue that nuclear weapons are cockroaches in the democratic soup. It is not possible to simply detach them from the general economy of power inside the democratic state and argue that nuclear-armed democracies are democracies like any others. True enough, all democracies are limited as "democracy is a political form incomplete by definition" as Pierre Rosanvallon observed.[23] But nuclear democracies are limited in a peculiar fashion. First, if democracy is limited by *nature*, the restrictions created by nuclear secrecy are in no way *natural*. They stem from the pursuit of nuclear weapons, an activity that most states throughout the last seventy decades have refrained from engaging in.[24] Second, nuclear policy cuts to the very heart of the state's fundamental purpose, to wit, to control and exert violence on behalf of its constituents. The trouble, then, is not only that certain parts of the nuclear state remain structurally out of citizens' reach, but that these unreachable parts control the level and nature of the violence the state is ready to exert. Because nuclear weapons provide the possibility of unprecedented destruction, they deserve a *higher* level of democratic control than any other issues, since there exist virtually no other issues with as potentially consequential implications for citizens.[25] Moreover, the restrictions stemming from secrecy regime are not uniquely the product of actors' agency – which would imply that the restricted nature of nuclear democracy could be undone – but the product of material constraints imposed by the security implications of nuclear technology. Although it would certainly be possible to govern nuclear weapons in *a more democratic way,* it would not be possible to govern them *democratically*.

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[22] Avishai Margalit, *On Compromise and Rotten Compromises* (Princeton: Princeton University Press, 2010), 97. I would like to thank Etienne Dignat for recommending this reading.
[23] Pierre Rosanvallon, *Democracy. Past and Future* (New York: Columbia University Press, 2006), 204. The idea of democracy as a naturally limited form of self-government is widely admitted, both in a historical and theoretical perspective. See Adam Przeworski, *Democracy and the Limits of Self-Government* (New York: Cambridge University Press, 2010); John Dunn, *Setting the People Free: The Story of Democracy*, Second edition (Princeton, NJ: Princeton University Press, 2019).
[24] See Benoît Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible* (Paris: Presses de Sciences Po, 2022), chap. 5.
[25] At the exception, perhaps, of artificial intelligence and climate change which both create the possibility of civilizational collapse, but whose governance is very different.

3. Contributions

By making the case for nuclearization as a form of political change that creates restrictions to democratic government, this dissertation aims to make four contributions to the literature. The first is a contribution to the study of democracy in the nuclear age and, most specifically, in the nuclear state. The second is a contribution to the study of nuclear secrecy, a relatively understudied topic. The third is an empirical contribution to the nuclear history of the three studied states. Finally, the findings have several implications for scholarship and policy.

First, this dissertation contributes to our understanding of the consequences of the "nuclear revolution" for democratic states. The "nuclear revolution" is a controversial concept, but it can be defined as a sudden and massive change in the material capabilities of destruction of states following the invention of nuclear weapons. After the Second World War, states developed weapons with the capability of "exterminating much of the human race" if used in a major war. As Campbell Craig notes, "this has never been possible before and so, by itself, constitutes a revolutionary development by anyone's reckoning."[26] The meaning of this profound change to the material conditions in which democracies exist has not been the object of attention, either by students of democracy or by students of nuclear weapons. The nuclear issue has been conspicuously absent from the recent wave of scholarship on democratic deficits in liberal democratic (and nuclear-armed) states.[27] Perhaps surprisingly, the nuclear

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[26] Campbell Craig, "Review: The Revolution That Failed: Nuclear Competition, Arms Control, and the Cold War. By Brendan Rittenhouse Green. New York: Cambridge University Press, 2020.," *Perspectives on Politics* 18, no. 4 (December 2020): 1304. Unlike Robert Jervis, who defines the nuclear revolution by specific effects following this change in material conditions (i.e that major war between great power become highly unlikely if not impossible), I choose to define the nuclear revolution solely in material terms. (Jervis' classic statement on the nuclear revolution can be found in Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca: Cornell University Press, 1989).

[27] Studies on democratic recoil and "post-democracy" include Colin Crouch, *Post-Democracy* (London: Polity, 2004); Guy Hermet, *L'hiver de La Démocratie, Ou, Le Nouveau Régime* (Paris: Armand Colin, 2007); Ivan Krastev and Stephen Holmes, *The Light That Failed: A Reckoning* (London: Allen Lane, 2019). Historians of democracy do not consider them either. E.g: John A. Ferejohn and Frances McCall Rosenbluth, *Forged through Fire: War, Peace, and the Democratic Bargain* (New York: Liveright Publishing Corporation, 2017); Dunn, *Setting the People Free*; Martin Conway, *Western Europe's Democratic Age, 1945-1968* (Princeton, NJ: Princeton University Press, 2020); David Stasavage, *The Decline and Rise of Democracy: A Global History from Antiquity to Today* (Princeton: Princeton University Press, 2020).

issue is peripheral also in the classics studies on democracy written after 1945.[28] Nuclear weapons are, usually, treated under the general notion of complex technical questions, along with energy, healthcare, or pollution.[29] This does not mean that no author has considered the problem of the relationship between democracy and nuclear weapons (see chapter 1). However, there has been little empirical analysis of the effects of nuclear weapons pursuit on democratic states as such. As a result, critical claims about technology's despotic effects on democracy remain to be backed up by evidence, and so are claims about the essential irrelevance of nuclear weapons for democratic development.

Second, I contribute to our understanding of nuclear secrecy as a political phenomenon. Nuclear secrecy occupies a paradoxical place in the literature on nuclear weapons because no author ignores its existence, but few problematize it. When mentioned, it is usually to serve as the *explanans*.[30] There are exceptions

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[28] For example, they are not mentioned in Giovanni Sartori, *Democratic Theory* (Westport: Greenwood Press, 1976). Robert Dahl's case is worth mentioning here. One of the major thinkers of democracy in the XXth century, he also was among the few who directly tackled the problem of nuclear-democracy in a book-length manner (Robert A. Dahl, *Controlling Nuclear Weapons: Democracy versus Guardianship* (Syracuse, N.Y: Syracuse University Press, 1985).) as will be discussed below, or as an integral part of his work on the theories and practices of democracy in *Congress and Foreign Policy, op. cit*. (1950). Yet, his work on democratic theory is generally indifferent to nuclear weapons. His *Preface to democratic theory* mentions them only once, and four brief mentions can be spotted throughout *Dilemmas of Pluralist Democracy*. His scholarship displays a clear disconnection between thinking about nuclear weapons specifically, and thinking about democracy generally, which can be interpreted as a lost opportunity to include the material reality of the nuclear age into democratic theory (Robert A. Dahl, *A Preface to Democratic Theory* (Chicago: University of Chicago Press, 2006), 69; Dahl, *Dilemmas of Pluralist Democracy*, 14, 15, 118, 121.) The same disconnection is evident in Charles Wright Mills who, before his premature death, had written a now classic book, *The Power Elite* (1956), frequently compared to Dahl's *Who Governs*. In his description of the logic of power inside the American state, he refers only once to nuclear weapons. Even though the book clearly engages with what he calls the "military ascendancy" and the fact that "the generals and admirals have increasingly become involved in political and economic decisions", the potential role of nuclear weapons in this configuration are not discussed. Two years later, however, he published a pamphleteer book entitled *The Causes of World War Three*, in which he applies his analysis of power in the United States to conclude that the executive preeminence made nuclear war more likely, as mass politics would eventually become trump by nuclear politics. Once again, nuclear weapons are treated as a specific case-study, rather than as elements to be integrated in democratic theory (Charles Wright Mills, *The Power Elite* (New York: Oxford University Press, 1956), 355, 199; Charles Wright Mills, *The Causes of World War Three* (New York: Ballantine Books, 1958). Generally, the link between materialism and democracy seems weakly theorized, and some consider that "the literature to a large extent neglects the material foundations of democracy". When they do not neglect it, "materiality" is frequently defined either in a Marxist sense as structures of capitalism, or, most recently, in ecological or "biophysical terms". (Melanie Pichler, Ulrich Brand, and Christoph Görg, "The Double Materiality of Democracy in Capitalist Societies: Challenges for Social-Ecological Transformations," *Environmental Politics* 29, no. 2 (February 23, 2020): 194.) A notable exception however is Timothy Mitchell, who considers the material conditions for democracy, but do not address nuclear weapons. Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, 2013).

[29] For example Robert A. Dahl, *Democracy and Its Critics* (New Haven: Yale University Press, 1989), 14–15, 67–70.

[30] For example, Gaurav Kampani uses secrecy as variable to explain the slow and confused development of India's nuclear program. Although he also sometimes considers the rationale for the development of nuclear secrecy regimes, Kampani mainly seeks to answer the question of why India took so long to develop its nuclear

to that which must be mentioned. In the field of anthropology, one thinks of Hugh Gusterson and Joseph Masco's work on secrecy in and around nuclear weapons laboratories.[31] In Science and Technology Studies, John Krige has notably studied the role of nuclear secrecy as a foreign policy tool in transatlantic relations.[32] More recently, historian Alex Wellerstein made a major contribution to the history of nuclear secrecy with his book on *Restricted Data* which retraces the development of the US nuclear secrecy regime since the Second World War.[33] Daniel Salisbury, too, recently published a volume on the history of nuclear information control in the UK, in which he uses party politics to explain why the British government shifted from secrecy to persuasion in its public relation approach to the nuclear debate.[34] Two elements are generally missing from these contributions, however. The first is the role of technology's agentic capacity in the development of nuclear secrecy – simply put, authors do not directly address the question of why all states that developed nuclear weapons felt compelled to shroud them deeply in secrecy – and the second is the question of secrecy's impact on democracy.[35] In this dissertation, I link those two components, first, by determining how nuclear weapons' intrinsic properties incentivized the development of secrecy regimes, and, second, by addressing the question of how these regimes restricted democratic government.

Third, this dissertation contributes to the study of British, French and Swedish nuclear history and the historiography of the 1945 to 1975 period more generally. The history of nuclear secrecy in France and Sweden has hitherto never systematically been addressed, and it has been addressed directly only for a

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program. Gaurav Kampani, *India's Nuclear Proliferation Policy: The Impact of Secrecy on Decision Making, 1980-2010* (New York, NY: Routledge, 2020).

31 Hugh Gusterson, *Nuclear Rites: A Weapons Laboratory at the End of the Cold War* (Berkeley: University of California press, 1996); Masco, *The Nuclear Borderlands*; Joseph Masco, "Lie Detectors: On Secrets and Hypersecurity in Los Alamos," *Public Culture* 14, no. 3 (2002): 441–67.

32 John Krige, *Sharing Knowledge, Shaping Europe: U.S. Technological Collaboration and Nonproliferation* (Cambridge, MA: MIT Press, 2016); John Krige, "Technodiplomacy: A Concept and Its Application to U.S.-France Nuclear Weapons Cooperation in the Nixon-Kissinger Era," *Federal History* 12 (May 2020): 99–116.

33 Alex Wellerstein, *Restricted Data. The History of Nuclear Secrecy in the United States* (Chicago: University of Chicago Press, 2021).

34 Daniel Salisbury, *Secrecy, Public Relations and the British Nuclear Debate: How the UK Government Learned to Talk about the Bomb, 1970-83* (New York: Routledge, 2020). For a longer discussion of Wellerstein, Salisbury and Kampani's book, I refer to Thomas Fraise, "La Question Du Secret Nucléaire : Technologie, Secrets d'État et Enjeux Démocratiques," *Critique Internationale*, no. 95 (June 2022): 171–80.

35 The exception here would Avner Cohen's book on Israel's policy of *amimut* (ambiguity), in which he directly engages the question of secrecy, democracy, and nuclear weapons. Avner Cohen, *Worst-Kept Secret: Israel's Bargain with the Bomb* (New York: Columbia University Press, 2010).

later period in the British case.[36] Based on primary sources, sometimes untapped, from all three cases, this dissertation provides the first account of the development of nuclear secrecy regimes and their consequences on democratic government in all three countries. The account offered here nuances our understanding of the post-war period as being "Western Europe's Democratic Age".[37] In France, the 1945–75 period is thought of as the "Glorious thirties" and seen a three-decade long period of economic growth. But, as Benoît Pelopidas has noted, the late 50s and 60s were also a period when the space of possible political futures shrank, making nuclear weapons "eternal" parts of humanity's future.[38] It was also, I argue, a period of democratic restrictions, during which the French, British and Swedish states experienced unprecedented forms of restriction to democratic control.[39] The notion of a "second wave of democratization" ignores the fact that, as democracy was developing quantitively, it was also being diminished qualitatively as restrictions emerged inside nuclear pursuers.[40]

Finally, by highlighting the democratic costs of nuclearization, these findings also address a key form of vulnerability that Benoit Pelopidas calls "epistemic vulnerability" – a situation when someone is tempted to accept as true what cannot, or has not, been proven.[41] This has implication for current debates

[36] Which does not mean that authors interested in the nuclear history of those states have not addressed secrecy *at all*. Rather, they did not address it as a specific object of study, integrating it into the general history of these states' nuclear program. For example, in the UK case, Margaret Gowing, *Independence and Deterrence. Britain and Atomic Energy. 1945-52. Volume II: Policy Execution* (London: Macmillan, 1988), chap. 16; Salisbury, *Secrecy, Public Relations and the British Nuclear Debate*. In France, one can find mentions of it in various accounts, but usually when discussing the period when the program was clandestine. See Jean-Damien Pô, "La Direction Des Applications Militaires Du Commissariat à l'Energie Atomique (1958-2000). Un Complexe Militaro-Scientifique Au Coeur de l'indépendance Stratégique Nationale" (Doctoral Dissertation, Paris, Paris Sorbonne, 2000), chap. 3; Dominique Mongin, "La Genèse de l'armement Nucléaire Français. 1945-1958." (Doctoral Dissertation, Paris, Paris 1 Sorbonne, 1991), chap. 6. It is the same for Sweden, see Thomas Jonter, *The Key to Nuclear Restraint: The Swedish Plans to Acquire Nuclear Weapons during the Cold War* (London: Palgrave Macmillan, 2016), 46–47; 134–35; Thomas Jonter, "Sweden and the Bomb. The Swedish Plans to Acquire Nuclear Weapons, 1945-1972," SKI Report (Stockholm: Statens kärnkraftinspektion, September 2001), 29–30. The same can be said about Wilhelm Agrell who adopts an essentially descriptive position. Wilhelm Agrell, *Svenska Förintelsevapen: Utvecklingen Av Kemiska Och Nukleära Stridsmedel 1928-1970* (Lund: Historiska media, 2002), 53–55.

[37] Conway, *Western Europe's Democratic Age, 1945-1968*.

[38] Benoît Pelopidas, "The Birth of Nuclear Eternity," in *Futures.*, ed. Jenny Andersson and Sandra Kemp (Oxford: Oxford University Press, 2021), 484–500.

[39] It must be noted that a similar re-assessment of the period has been conducted already, focusing on pollution and critics of modernization, in Céline Pessis, Sezin Topçu, and Christophe Bonneuil, eds., *Une Autre Histoire Des "Trente Glorieuses": Modernisation, Contestations et Pollutions Dans La France d'après-Guerre* (Paris: La Découverte, 2013).

[40] The classic statement on the second wave of democratization being Samuel P. Huntington, *The Third Wave: Democratization in the Late Twentieth Century* (Norman: University of Oklahoma Press, 1991).

[41] Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, 183.

on nuclear modernization or abolition. The current nuclear-armed states are all engaged in long-term nuclear modernization programs geared toward perpetuating their arsenals for multiple decades, while the dismantlement of current arsenal could take up to ten years.[42] In this context, assessing the impacts of nuclear weapons in all their forms is timely so that those debates can be grounded in a proper understanding of the consequences. Most importantly, the implications of modernization programs for democratic states are not the same if we assume that have no political effects for democratic government, or if we know them to have a democratic costs.[43] The prevailing "ideology of nuclear order" draws attention primarily to horizontal proliferation and potential threats to strategic stability, rendering the continuous rebuilding of existing nuclear arsenals largely invisible.[44] But this is not exact. By arguing that nuclear weapons have a direct impact on the nature of democratic government, I show that nuclear modernization is not just a strategic choice, but also has an impact on the political system they purport to defend.

4. Methods: a parallel demonstration of nuclearization in European democratic states

To provide evidence for my argument, I chose to rely on the methods of parallel demonstration based on three qualitative historical case studies: the British nuclear program (from 1945 to 1958), the Swedish nuclear program (from 1947 to 1972) and the French nuclear program (from 1954 to 1974). The methods of parallel demonstration, according to Skocpol and Somers, aims to "persuade (…) that a given, explicitly delineated hypothesis or theory can repeatedly demonstrate its fruitfulness—its ability convincingly to order the evidence—when applied to a series of relevant historical trajectories."[45] I

[42] Benoît Pelopidas and Sanne Cornelia J Verschuren, "Writing IR after COVID-19: Reassessing Political Possibilities, Good Faith, and Policy-Relevant Scholarship on Climate Change Mitigation and Nuclear Disarmament," *Global Studies Quarterly* 3, no. 1 (January 20, 2023): 4; Zia Mian and Benoît Pelopidas, "Producing Collapse. Nuclear Weapons as Preparation to End Civilization," in *How Worlds Collapse. What History, Systems, and Complexity Can Teach Us About Our Modern World and Fragile Future*, ed. Miguel Angel Centeno et al. (London ; New York: Routledge, 2023), 328–29.

[43] Especially because the effects of nuclear weapons have historically been systematically underestimated. Lynn Eden has shown, for example, how US planning forgot about the fire effects when studying the material effects of nuclear weapons (Lynn Eden, *Whole World on Fire: Organizations, Knowledge, and Nuclear Weapons Devastation* (Ithaca, N.Y.: Cornell University Press, 2004). Similarly, Benoit Pelopidas has shown how the role of luck in the avoidance of undesired nuclear explosion since 1945 has been neglected by almost all scholars and policymakers. Benoît Pelopidas, "The Unbearable Lightness of Luck: Three Sources of Overconfidence in the Manageability of Nuclear Crises," *European Journal of International Security* 2, no. 02 (July 2017): 240–62.

[44] Kjølv Egeland, "The Ideology of Nuclear Order," *New Political Science* 43, no. 2 (April 3, 2021): 208–30.

[45] Theda Skocpol and Margaret Somers, "The Uses of Comparative History in Macrosocial Inquiry," *Comparative Studies in Society and History* 22, no. 2 (April 1980): 176.

studied those cases on the basis of primary sources, collected in nine different archives in the UK, France and Sweden.[46] The secrecy surrounding nuclear archives has made research difficult – for example, I have not been able to access the archives of the *Commissariat à l'Energie Atomique* (French Atomic Energy Commission, the CEA).[47] However, it certainly has not made it impossible and I have been able to gather a sufficient number of documents to trace the history of these states' nuclear secrecy regimes.[48]

The periodization of the cases follows them from the beginning of their nuclear program to the end of the development of the first generation of nuclear weapons – or, to the point of renunciation to such development – and to the end of atmospheric testing programs. Since my main variable is nuclear technology itself, I have defined the boundaries of my cases based on technological, instead of political, evolutions. In each case, I will trace the origins of nuclear secrecy regimes, their development, and their effects on modes of democratic control.

The United Kingdom officially started its nuclear weapons program in January 1947.[49] It carried out its first nuclear test – the accepted criteria for a state to be deemed "nuclear" – in October 1952. By 1958, it had reached a thermonuclear capacity and possessed vectors able to carry its nuclear weapons. 1958 is also the year when the UK stopped testing nuclear weapons atmospherically, transferring these

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[46] The National Archives (Kew, UK), the Service Historique de la Défense (Vincennes, France), the Archives Nationales (Pierrefitte-sur-Seine, France), the Archives de l'Observatoire des Armements (Lyon, France), the Centre Historique de Sciences Po (Paris, France), the Musée Curie (Paris, France), the Riksarkiv (Marieberg, Sweden), the Krigsarkiv (Arninge, Sweden), and the Arbetarrörelsens Arkiv (Huddinge, Sweden). I have also used digital archives from the National Security Archives (nsarchive.gwu.edu), the Wilson Center (digitalarchive.wilsoncenter.org), the National Archives of Australia (naa.gov.au) and the Mémoires des hommes website (memoiredeshommes.sga.defense.gouv.fr).

[47] Technically, these archives are open to the public but, for the lack of access to inventories, the researcher is dependent on archivists' to get access to documents. I was originally told that no documents interesting my research could be found there. After some time, I was promised certain documents in May 2022, but I have yet to receive them. Moreover, I was also told that certain services of the CEA, notably the one responsible for the protection of secrecy, retain their archives and therefore do not make them accessible for public consultation (Personal communication with the CEA Archivist, 31st March 2021). On the current situation of French nuclear archives, see Austin Cooper, "A New Window into France's Nuclear History," *Bulletin of the Atomic Scientists* (blog), September 16, 2022, https://thebulletin.org/2022/09/a-new-window-into-frances-nuclear-history/. In a similar fashion, I have been unable to consult many documents from the AB and ES files, which contains documents on UK nuclear history, at the Kew national archives as they are currently (as of June 2023) still being reviewed since November 2018. https://www.nationalarchives.gov.uk/about/freedom-of-information/information-requests/review-of-the-ab-series/

[48] As recently noted by Florent Pouponneau, the secrecy surrounding an object does not prevent its scientific study but rather affects the strategies used to collect data. Florent Pouponneau, "Refuser Le Défaitisme Face Au Secret : Stratégies de Recherche Pour Les Sciences Sociales de l'international," *Cultures & Conflits*, no. 118 (December 1, 2020): 19–36.

[49] For precisions on each country's starting point in their nuclear program, see chapter 3.

activities to US underground test sites. France's nuclear history is slightly more complicated. Though nuclear research started as early as 1945, it was only in 1954 that the *Commissariat à l'Energie Atomique* (French Atomic Energy Commission, the CEA) truly started its military orientation. The first French nuclear explosion took place in February 1960. Eight years later, France carried out its first thermonuclear explosion. By 1974, it stopped testing nuclear devices over the Pacific and went underground.

The presence of Sweden offers the possibility of studying a state that did *not* acquire nuclear weapons, but seriously pursued such acquisition. As Thomas Jonter has shown, the Swedish plans to acquire nuclear weapons went very far and deserve to be qualified as a "nuclear weapon program". By the end of the 50s, aside from having thoroughly research nuclear weapons design,

> A uranium plant and a fuel fabrication facility were already in operation, at least two reactors capable of production of weapons-grade plutonium were built (Ågesta and Marviken), Sweden had about 50 tons of inspection-free heavy water at its disposal (an additional 50 tons were needed), and several arrangements to equip Swedish-built jet attack aircrafts with nuclear weapons had been conducted.[50]

One should also add that Swedish officials had started considering the requirements for nuclear testing, both atmospheric and underground, and investigated sites for nuclear weapons production and storage.[51] The program started somewhere between 1947 and 1949. No clear start date can be identified, but nuclear weapons started to be researched during that period inside *Försvarets forskningsanstalt* (the Swedish Institute for Military Research, FOA). After internal debates, the program was phased out and abandoned, Sweden ratifying the Non-Proliferation Treaty in 1970 and the last plutonium lab being closed in 1972.

I selected those three cases based on their similarities and variations. These cases are similar in the sense that they share a similar mode of government – all three are liberal democratic states – evolved in a similar security environment – the European Cold war – and engaged in the pursuit of nuclear weapons

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[50] Thomas Jonter, "The Swedish Plans to Acquire Nuclear Weapons, 1945–1968: An Analysis of the Technical Preparations," *Science & Global Security* 18, no. 2 (June 30, 2010): 81. On the Swedish nuclear program more generally, the reference is Jonter, *The Key to Nuclear Restraint*.

[51] FOA, PM rörande lokalisering av försökstation, 21st January 1958, Hemlig, 85:8, FOA Archives, Ö IV:10-14, RA; FOA, Memo "Om kostnader för kärnvapenprov i berg", 22nd March 1963, Hemlig, Ö IV: 23-21, RA; Agrell, *Svenska Förintelsevapen*, 158.

over the same period. They also share differences of interest for my analysis. First of all, the selection allows for variation on my first variable – technology – as Sweden offers a case of nuclear renunciation of nuclear weapons while France and the UK provide cases of acquisition. This allows me to check whether nuclearization stops when states abandon their nuclear ambition, or if there is some form of hysteresis. Second, the states in the sample each have different relationships with the United States and therefore are likely to be submitted to different levels of diplomatic pressures, allowing me to check whether it does work as a form of constraint or not.[52] Finally, though they are all liberal democracies, they have different constitutional systems, as well as different practices of secrecy.[53]

It must be noted that this dissertation focuses solely on nuclear *weapons*. Throughout this dissertation, therefore, I will use the term "nuclear program" or "nuclear secrecy" to refer specifically to the politics of nuclear weapons. Nuclear energy programs will only be referred to inasmuch as they were intertwined

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[52] The UK shares, since 1945, a "special relationship" with the United States, with a uniquely close cooperation in Europe. France, over the studied period, has had different stance toward the US. Under the IVth republic, as Jenny Raflik has shown, it was willing to cooperate and sought US security guarantees. After 1958, under the Vth Republic, it took its distance while nevertheless remaining in NATO and under the US nuclear umbrella. In terms of technological cooperation, however, it kept its distance with the US and never sought to make too many sacrifices in this sense. Sweden, eventually, was not a member of NATO and officially kept an "alliance free" (*alliansfrihet*) stance. It was, in practice, hardly neutral and aware that its security position did not allow it to break ties with the US, especially in terms of technological cooperation. On the UK "special relationship", see John Baylis, *Anglo-American Defence Relations, 1939-1984: The Special Relationship* (London: Macmillan, 1984). On France's relationship to NATO under the Vth Republic, see Jenny Raflik-Grenouilleau, *La Quatrième République et l'Alliance atlantique. Influence et dépendance, 1945-1958.* (Rennes: Presses Universitaires de Rennes, 2013). On De Gaulle foreign policy, see Maurice Vaïsse, *La Grandeur: Politique Étrangère Du Général de Gaulle, 1958-1969* (Paris: Fayard, 1998). And on France evolving stance toward NATO, see Christelle Calmels, "Influence in a Military Alliance. The Case of France at NATO (2009-2019)" (Doctoral Dissertation, Paris, Sciences Po, 2021), chap. 1. Finally, on Sweden and NATO during the Cold war, see Mikael Holmströme, *Den Dolda Alliansen : Sveriges Hemliga NATO-Förbindelser* (Stockholm: Bokförlaget Atlantis, 2012); Robert Dalsjö, *Life-Line Lost: The Rise and Fall of "neutral" Sweden's Secret Reserve Option of Wartime Help from the West* (Stockholm: Santérus Academic Press, 2006). On Swedish technological cooperation with the US, see Thomas Jonter, "Ett Tänkbar Tolkningsgram För Svensk-Amerikanska Studier under Kalla Kriget," in *Sverige Inför En Ny Världsordning, 1945-50 : Formativa År För Svensk Utrikespolitik?*, ed. Charles Silva and Thomas Jonter (Stockholm: Utrikespolitiska institutet, 1995), 29–42; Mikael Nilsson, *Tools of Hegemony: Military Technology and Swedish-American Security Relations 1945-1962* (Stockholm: Santérus Academic Press, 2007).

[53] On the British "culture of secrecy", thought to stem from an elitist conception of policy which nevertheless remains controlled by Parliamentary checks, see David Vincent, *The Culture of Secrecy: Britain, 1832-1998* (Oxford ; New York: Oxford University Press, 1998). On the development of state secrecy in France, which followed a different logic and led to the development of a "secret surveillance state" operating on the margins of political control, see Sébastien Laurent, "Is There Something Wrong with Intelligence in France? The Birth of the Modern Secret State," *Intelligence and National Security* 28, no. 3 (June 2013): 299–312; Sébastien Laurent, *Politiques de l'ombre: État, Renseignement et Surveillance En France* (Paris: Fayard, 2009). On Sweden's relation to state secrecy, which entails a rather transparent administrative practices, and the development of ultra-secret aspects government in reaction to this transparency, see K. G. Robertson, *Public Secrets: A Study in the Development of Government Secrecy* (New York: St. Martin's Press, 1982), chap. 5; Stefan Ekecrantz, *Hemlig utrikespolitik: kalla kriget, utrikesnämnden och regeringen 1946-1959* (Stockholm: Santérus, 2003).

with military research. However, it would be interesting to apply a similar framework not to nuclear *weapons* technology specifically but to nuclear technology more generally, and to assess whether nuclearization also takes places when a country pursues the acquisition of nuclear reactors.

5. Outline of the dissertation

This dissertation is organized in five chapters. In the first chapter, I present my theoretical argument. Based on a critical review of existing work on nuclear weapons and democratic states, I show that scholarship has failed to grasp the effects of nuclearization on state structures and, therefore, failed to answer the question of how and why nuclear weapons affect democratic government. I propose a new theoretical framework that, by focusing on nuclear secrecy regimes as products of technology's agentic capacity, helps demonstrate the effects of nuclearization on the public's ability to control state actions. Nuclearization, I argue, produce restricted democracies, states which satisfy most of the criteria for democratic-ness but where the most existential part of state actions remains out of their control.

In the following chapters, I provide evidence for my argument, drawn from the three empirical case studies presented in the introduction. In chapter 2, I look at the origins of nuclear secrecy in the 1939-1946 period, when nuclear weapons were invented and subsequently perpetuated. I seek to establish how the intrinsic properties of nuclear weapons led to the choice of secrecy as a solution for security against nuclear weapons in an anarchic world. I show that the invention of nuclear weapons linked nuclear research to security concerns, creating a need for secrecy over nuclear research which did not exist otherwise. This implies that technology has some causal effects. However, I argue that these causal effects were not determined solely by technology but also by their context: the security implications of nuclear weapons could have been addressed differently, notably by an international control over atomic energy. The reason this solution was not adopted was not that it was materially *impossible,* but that it was politically *undesirable*. In this specific context, the technopolitics of nuclear weapons created a need for states to use secrecy to address their security implication. It established a secrecy imperative for security in a nuclear-armed world.

To make this case, I look at three critical junctures in the early history of nuclear weapons: the discovery of nuclear fission, sometimes thought as the beginning of nuclear secrecy's history, the moment of the

British MAUD report which established with a high level of certainty the possibility of creating nuclear weapons, and the immediate post-war period, when plans for the international control of the atom were discussed. I show that, contrary to what some have written, the discovery of fission did not kickstart any secrecy imperative for actors. In fact, because most of those involved in fission research believed a nuclear bomb to be either impossible or decades away, few felt a need to shroud nuclear science in secrecy. It was only when the MAUD report, a secret British report on the possibility of making atomic bombs, confirmed the security implications of nuclear fission that the curtain of secrecy dropped. Having learned that a bomb of tremendous power could in fact be manufactured within a reasonable time frame, actors felt obliged to act to prevent adversaries – primarily, the Nazis – from acquiring them. At war's end, when the secret of the bomb was revealed to all, actors faced a choice: an international control regime which could offer security from nuclear weapons or relying on domestic arrangements for secrecy as a solution for security. In a nutshell, they faced a choice between either remaking the world or remaking the state. For contingent reasons, international control failed, leading US policymakers to decide that wartime measures of secrecy should continue – indefinitely – in peacetime. In making that choice, they made secrecy into a global imperative.

In the third chapter, I turn to the three case studies specifically and show how, when those states initiated their respective nuclear programs, the secrecy imperative weighed on state officials and justified their choice to create specific information control regimes. The British, Swedish, and French cases followed different paths to a similar outcome. In the UK, where the nuclear program was swiftly decided after the war, the technological imperative was combined with a strong constraint coming from the US. A participant in the Manhattan project, the UK state was aware that the knowledge it had acquired during the war had serious security implications. Few actors debated the relevance of secrecy when it came to nuclear weapons, though many argued that a strong secrecy regime was undesirable. When in 1947 the project got a military orientation, UK policymakers faced two issues. One was their desire to cooperate more closely with the United States whose officials claimed they would only do so if the British secrecy regime proved stringent enough. The other was their desire to avoid confrontation and debate over the nuclear program in a state where there existed no consensus. To solve both these issues, British officials

decided to exacerbate the secrecy regimes, deciding to hide not only the content of nuclear policy, but also its purpose.

In Sweden, which did not engage in nuclear research during the war, secrecy was less of a problem when interest in atomic energy grew in late 1945. For a while, many scientists were principally opposed to secrecy over nuclear research – until the point when they realized the security implications. When it became clear that their research, even civilian, could lead to the production of nuclear weapons, secrecy became an imperative. By 1947, Swedish nuclear research became classified. This situation would only become stricter as Sweden engaged in cooperation with the US. Eager not to be excluded from the US-dominated European market, officials from the neutral Sweden yielded to US diplomatic pressure. As a result, they created export controls regulations over nuclear technologies and felt a need to reinforce secrecy measures around nuclear research centers. In 1949, when nuclear weapons research was officially on FOA's agenda, secrecy was such that the public would not hear about it.

What about France? There, secrecy took more time to set in. For a few years, from 1945 to the early 50s, the CEA resisted the imperative of secrecy. Aware that information control was important, notably for the preservation of industrial invention, the CEA nevertheless refused to engage too much in the practice of secrecy, arguing that it was not doing any military research. Uninterested in technological cooperation with the United States, it felt little need to react to the constant diplomatic pressure. But, as time went by, the pressure grew stronger. The security implications of nuclear research became hard to ignore, and US pressures grew. The CEA policy changed with the arrival of a new administrator, Pierre Guillaumat. Guillaumat was in favor of secrecy not only because he understood the risks of espionage and leaks, but also because he wished France to have a nuclear weapon program and feared that the public might not be in favor of it. Aided by a political leadership afraid of such a debate, Guillaumat chose to shroud not only the content of France's nuclear policy in secrecy, but also its entire purpose.

For each of the three cases, I show that the decision to create nuclear secrecy regimes was primarily, but not uniquely, justified by security concerns. Diplomatic pressure coming from the United States and domestic concerns over protests against the decision to acquire nuclear weapons also played a role in defining the boundaries of secrecy. The minimal boundaries of secrecy, the *raison d'être* of the nuclear

secrecy regime, stemmed from nuclear weapons' material constraints, but their maximal boundaries were defined by political factors.

Having established that changes in state structures, in the form of the apparition of nuclear secrecy regimes, can be attributed to nuclear weapons' technopolitics, I then turn to an analysis of the democratic implications of these regimes. In chapter 4, I study how legislative control over nuclear policymaking was rendered ineffective by secrecy, as MPs were constantly unable to obtain accurate information about past, future and present policy choices. This, I argue, was the result of different mechanisms stemming from secrecy regimes that either excluded the public from decision-making procedures, distorted the information given to them, or facilitated denial and self-inflicted blindness over nuclear issues. Studying the making of nuclear policy in the UK, France and Sweden during the period when the program was "clandestine" and the period when it is officially acknowledged, I show that secrecy prevent effective control over different levels of policy. During the clandestine period, MPs had no control over any level of policy, being excluded from all forms of decision-making. When the programs were acknowledged, the thick layers of secrecy surrounding nuclear policy continued to prevent MPs from exerting control over both action policy (the plans for deployment and uses of the nuclear arsenal) and force development policy (the procurement and development choices related to the arsenal). In France, as in the UK, practices of obfuscation continued as security was invoked to prevent MPs from acquiring actual knowledges about policy choices. In Sweden, where the program was phased out in the early 60s, the continuation of secrecy over nuclear research – justified by the security implications of these activities – allowed certain officials to contemplate the possibility of pursuing nuclear weapons. In fact, it was not until the 1990s that the extent of nuclear research in Sweden was publicly revealed, showing the hysteretic nature of nuclear secrecy – even after the program ends, secrecy persists as constraints persist.

In chapter 5, I turn to the problem of nuclear harm and risks of harm by studying specifically the problem of secrecy around atmospheric nuclear testing. I show how secrecy made deliberation, oversight and accountability mechanisms ineffective when it came to nuclear testing sites and show that secrecy allowed British and French officials to effect nuclear tests and repeatedly expose their population to harm and risks of harm without any sort of public control. I argue that such concealment was made

possible by the necessity to protect the "strategic secrets" of countries' nuclear arsenal – i.e., the technical data about the devices tested. This led to the emergence of very strict regimes of secrecy that offered actors the possibility of concealing the "dark secrets" of radioactive contamination. Not only was deliberation flawed, as the public was badly informed about the risks, but oversight was also made impossible by the fact that only select actors with vested interest could acquire knowledge of radioactive contamination. Moreover, the establishment of a state monopoly on the production of fallout data not only allowed state officials to conceal those data, but it also biased their collection, leading to gaps in data collection and an accountability deficit. As a result, officials escaped responsibility for the nuclear harm they caused. This, I argue, shows how the requirements of nuclear secrecy make democratic states highly vulnerable while offering state officials de facto powers they would not have possessed otherwise.

From this, I conclude that the process of nuclearization has structurally restricted democratic control over state actions, warranting the claim that nuclearization restricts the ability of citizens of nuclear states to govern themselves. To assert my case, I conduct in the conclusion a plausibility probe on other cases of nuclear-armed democracies and show that similar patterns can be found. From this, I propose different paths for future research.

Chapter 1. Democracy in the nuclear state.

How nuclear secrecy regimes create restricted democracy.

In this chapter, I present a theoretical framework to address the question of nuclear technology's effects on democratic government.[1] I ask: how does nuclear weapons pursuit affect democratic states? While the existing literature, notably in nuclear security studies and in political theory, has pointed to the existence of a democratic deficit in nuclear weapons governance, I argue that it remains unclear why this is so, how it came to be, and what its consequences for democratic government inside those states are.

To answer this question, I propose drawing from STS approaches to look at how technologies can affect the environment of actors by creating structural constraints which shape their choices. Focusing on nuclear secrecy regimes, I argue that the exceptional destructivity of nuclear weapons, absent proper international political arrangements offering security against it, constrains states seeking to acquire nuclear weapons into adopting regimes of secrecy designed to tame the security implications of nuclear knowledges.[2] Simply put, certain knowledges related to nuclear weapons are too dangerous not to be controlled, constraining states to shroud them in secrecy. I term this process of structural change *nuclearization*. I contend that these secrecy regimes are not, merely, the product of those constraints: external pressures and domestic choices also participate in the definition of their boundaries. Nevertheless, I argue that the primary mechanism behind the development of nuclear secrecy regimes

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[1] I will use the term democratic government interchangeably with democracy throughout this dissertation. I chose "government" instead of democratic *governance*. With Henrik Enroth, I contend that, though the two terms are very similar in their uses, they differ in their subjects and objects. While governance is a mode of rule oriented toward solving problem, government is oriented toward ruling people. Democratic governance, therefore, refers to the processes through which states solve particular policy problems, while government refers to the relation of citizens with their states, and the processes through which this relation is established. This distinction is rather flexible, in practice, but justifies the use of "government" throughout the following pages. See Henrik Enroth, "Governance: The Art of Governing after Governmentality," *European Journal of Social Theory* 17, no. 1 (February 2014): 60–76.

[2] I use the category of "nuclear knowledges" to refer to all forms of knowledges related to the production, deployment of intended use of nuclear weapons, without distinction between scientific forms of knowledges, and social or political ones. The term "knowledges" constitutes an umbrella term to include such things as technical data, strategic ideas, or plans, or information related to a state's arsenal. I discuss the boundaries of my definitions in section 3.

is the reaction to the structural constraints created by technologies. This means that the pursuit of nuclear weapons can shape the internal structures of states, including democratic ones. Nuclear weapons pursuit is not simply a process of weapon procurement: it is a process of political change.

These regimes of secrecy affect democratic government by restricting the ability of the public to exert control over state actions in a domain of utmost importance. Nuclear weapons lead to the rise of *restricted* democracies, states that correspond to all the basic criteria for democratic government, but where existential issues are left out of the field of democratically decidable choices. Citizens of nuclear states may be able to exert control on many domains of state actions, but not on the large-scale violence that state officials are ready to exert on them and other states on their behalf. Nuclear weapons pursuit, therefore, not only leads to a democratic deficit, but also tarnishes the very concept of democratic government.

This chapter is organized into three sections. In the first one, I provide an overview and critique of the existing literature interested in nuclear weapons and democratic states. Then, I turn to my theoretical framework, and outline my argument about nuclearization, focusing on nuclear secrecy regimes. Finally, I show how nuclearization affects democratic government. Defining democracy by the ability of the public to control state actions, I show how nuclear secrecy regimes restrict such control, leading to the rise of restricted democracy.

1. How do nuclear weapons affect democratic states? Probing the existing literature

In this section, I critically review existing scholarly fields of relevance to the question of nuclear weapons' effects on democratic states. It seems logical to turn to three bodies of literature for insights: the historical sociology of the state (HSS), which engages both in the study of political processes and the study of states as historical objects; nuclear security studies, whose sole object is the politics of nuclear weapons, including in democratic states, and political theory, which is concerned about the meaning of nuclear weapons for key concepts of politics, at the state and international levels.[3]

[3] This does not imply that these are the only relevant literatures: other approaches, such as feminist studies, have tackled similar questions. For example, Claire Duncanson and Catherine Eschle, "Gender and the Nuclear

Existing literature provides different contributions. HSS, first, show how nuclear weapons can affect democratic states by affecting their external environment, and creating conditions for democratic development. This perspective, however, simply ignores the possibility that nuclear pursuit might affect the trajectory of this democratic development as it only considers the effects of nuclear weapons' apparition at the international level, not at the state-level. Nuclear security studies, second, show that the pursuit of nuclear weapons is linked with different changes at the state-level, particularly with the appearance of undemocratic forms of government when it comes to nuclear issues. However, it does not provide an explanation as to how these changes unfolded, nor what caused them, leaving unanswered the question of nuclear technology's causal effects. Finally, political theorists argued convincingly that the apparition of nuclear weapons, with their exceptionally destructive properties, has deeply affected nation-states, and democracy as a whole. Political theorists propose a clear answer as to *why* nuclear weapons can change states, pointing to the causal power of technology. However, these analysis are not empirically backed. This means that it remains to empirically determine whether the causal power attributed to technology exists. Moreover, the question of *how* these effects translate historically into specific political arrangements too, is unanswered. This point to the necessity of crafting a theoretical framework that can empirically capture the effects of nuclear pursuit on democratic states and assess their effects on democratic government.

a. Historical sociology of the state

Historical sociology studies the state as a historical phenomenon shaped over the l*ongue durée*. It developed in the 1980s, notably with the now classic *Bringing the state back in*.[4] As it considers the modern state as an ever-evolving form of organized political domination, characterized principally by its monopoly over the means of violence,[5] it has insisted on the importance of military organization, war and international conflicts, in shaping state structures – an idea well illustrated by Charles Tilly's oft-

Weapons State: A Feminist Critique of the UK Government's White Paper on Trident," *New Political Science* 30, no. 4 (December 2008): 545–63. Their focus, however, is more on matters of state identity and power, and not on state structures per se. Consequently, I have left them out.

[4] Peter B. Evans, Dietrich Rueschemeyer, and Theda Skocpol, eds., *Bringing the State Back In* (Cambridge ; New York: Cambridge University Press, 1985).

[5] Christopher Pierson, *The Modern State*, 3rd ed (London ; New York: Routledge, 2011), 7.

quoted aphorism: "war made the state, and the state made war".[6] HSS scholars have devoted limited attention to nuclear weapons. When they have, their effects have been understood to be mainly indirect, operating at the international system level, meaning that HSS has not adopted the adequate level of analysis. This has led some authors to conclude that nuclear weapons had little to no effects on democratic states. This shows that HSS is guided by the assumption that technologies do not have causal power at the unit-level.

At first glance, historical sociology seems uninterested in nuclear weapons, framing them as almost irrelevant to its questions. This limited interest can first be discerned in the chronologies used to date the changing trajectories of modern states. In contemporary accounts, 1945 plays a central role indeed. However, 1945 is noted not as the beginning of the nuclear age, but as the start date of the modern international order that helped shape modern states through the foundation of the UN, the Bretton Woods agreements and the acceleration of decolonization processes. Theorists of the "capitalist state" typically start their accounts in 1929[7] or earlier, with Fordism.[8] Others focus on the end of Bretton Woods, with the first oil crisis of the 1970s, especially for thinkers of interdependence.[9] Martin Conway's *Western Europe's Democratic* Age starts in 1945, but never mentions nuclear weapons in his history of postwar (re)construction of democratic states.[10] Eric Hobsbawm placed his chronological cursor in the 1960s, due to the supposed "tendency for state centralization to decline" during that period.[11] More recently, the end of the Cold War, or the September 2001 terror attack events and 2008 financial crisis, are seen as other crucial moments for the future of democratic states.[12] Nuclear weapons are not understood as

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[6] Charles Tilly, "Reflections on the History of European State-Making," in *The Formation of National States in Western Europe*, ed. Charles Tilly (Princeton: Princeton University Pres, 1975), 42.
[7] Martin Carnoy, *The State and Political Theory.* (Princeton: Princeton University Press, 1982), 195–98.
[8] Bob Jessop, *The Future of the Capitalist State* (Cambridge, UK : Malden, MA: Polity ; Blackwell Publishers, 2002), 56.
[9] Joseph S. Nye and Robert Keohane, *Power and Interdependance* (Princeton: Longman Classics, 2012), 211.
[10] Conway, *Western Europe's Democratic Age, 1945-1968*.
[11] Eric J. Hobsbawm, "The Future of the State," *Development and Change* 27, no. 2 (1996): 273.
[12] Georg Sørensen, "The Future of the State," in *Routledge International Handbook of Contemporary Social and Political Theory*, ed. Gerard Delanty and Stephen P. Turner (London: Routledge, 2011), 395.

crucial for analysis and certainly are not considered "revolutionary" as their advent appeared not to have interrupted or transform the logic of historical processes.[13]

To be sure, limited interest does not mean total unawareness. Some do have things to say about nuclear weapons, albeit not as a national-level concern. An exception is William McNeill, historian of the relationship between the military, technology, and the state. He notes that nuclear missiles "constitute a mutation of the art of war with which soldiers' psychology does not easily keep up". [14] However, he is uneasy about their existence and remains uncertain about their broader effects on political organizations. Generally, their consequences at the national level are conceptualized as only indirect: nuclear weapons alter the general environment of states, therefore transforming the conditions of domestic power. In Michael Mann's classic on the *Sources of Social Power*, nuclear weapons are conceived as a background element of the Cold War, responsible for the peaceful environment which allowed for the economic development of the West as "once nuclear weapons made war irrational and economic competition became the main thrust of the cold war, the West had a big advantage".[15] A similar, yet less optimistic, perspective appeared in Charles Tilly's classic study of *Coercion, Capital & European States*. For Tilly, by compounding the cost of nuclear war, nuclear weapons "and other technical menaces" helped the formation of a bipolar order "that affected the politics, and the military prospects, of most states".[16]

This led some to draw conclusions about their influence on democratic states most specifically. Yuval Noah Harari concluded that liberal democracy was saved by nuclear weapons "because it prevented the permanent war-footing that is considered to hurt democracies.[17] For Josef Joffe, "nuclear weapons banished a key threat to liberal democracy in the face of powerful foe: the fevered pitch of permanent

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[13] One must note that this absence is quite structural. For example, in his recent synthesis on *The state, Past, Present, Future*, Bob Jessop mentions nuclear weapons only once, in passing, even though one could expect them to play an important role in its future. Bob Jessop, *The State: Past, Present, Future* (Malden, MA: Polity Press, 2016), 232.
[14] William Hardy McNeill, *The Pursuit of Power: Technology, Armed Force, and Society since A.D. 1000* (Chicago: University of Chicago Press, 1984), 382.
[15] Michael Mann, *The Sources of Social Power : Globalizations (1945-2011)*, vol. 4 (New York: Cambridge University Press, 2012), 128, 33–36, 308–9.
[16] Charles Tilly, *Coercion, Capital, and European States, AD 990-1990* (Cambridge, MA: Blackwell, 1990), 202, 197.
[17] Yuval Noah Harari, *Homo Deus: A Brief History of Tomorrow* (New York: Vintage Books, 2016).

mobilization, paranoid nationalism and the temptation of Caesarian politics".[18] These claims, however, cannot be taken at face value as they are based on a flimsy counterfactual in which a Soviet invasion of Europe was a certainty, were it not for nuclear weapons. But Vojtech Mastny, has argued that, in the European context, nuclear weapons were in fact "irrelevant to deterring a major war that the enemy did not wish to launch in the first place".[19] Moreover, these claims are made without checking for the potential effects of nuclear weapons at the domestic level. They simply allege that they prevented invasion and, therefore, externally imposed political change, but without investigating if democratic states changed in the process of pursuing nuclear weapons.

HSS scholars consider that nuclear weapons do not *do* anything to states, but instead transform the international environment in which they evolve. And, as such, it means that each state – democratic or not – is affected in similar ways or, rather, that the effects of nuclear weapons depend not on whether a state possesses some, but on whether it affects its external environment.[20] But this conclusion is based on an untested assumption: HSS simply does not investigate what nuclear weapons do to state structures. This perhaps stems from HSS' conception of technology's causal power. Indeed, as Warren Chin argues, generally speaking and with a few exceptions HSS has not lent much causal power to technology, probably because "the history of war is characterized by long phases of technological stagnation punctuated by occasional spasms of revolutionary change".[21] Hence the focus on economics, as evidenced by the chronologies. This runs counter to this history of nuclear weapons, whose effects were sudden and radical, prompting a massive change in the security environment of states, and requiring massive efforts on the part of those seeking such capabilities. Moreover, HSS has been described by John Hobson as operating with a "neo-realist" conception of states, which only "adapt or conform to the

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[18] Josef Joffe, "Democracy and Deterrence. What Have They Done to Each Other?," in *Ideas & Ideals. Essays on Politics in Honor of Stanley Hoffmann*, ed. Linda B. Miller and Michael Jospeh Smith (Boulder: Westview Press, 1993), 112.
[19] Vojtech Mastny, "Imagining War in Europe," in *War Plans and Alliances in the Cold War*, ed. Vojtech Mastny, Andreas Wenger, and Sven Holtsmark (London: Routledge, 2006), 13. See also Matthew Evangelista, "The 'Soviet Threat': Intentions, Capabilities, and Context," *Diplomatic History* 22, no. 3 (July 1998): 439–49.
[20] Implicitly, one would deduce from Mann and Tilly that the only weapons that truly mattered historically were the Russian and American ones, since it is those which produced the bipolar order.
[21] Warren Chin, "Technology, War and the State: Past, Present and Future," *International Affairs* 95, no. 4 (July 1, 2019): 767.

logic of the international political system".[22] Such a perspective does not adopt the adequate level of analysis to answer the question. Consequently, HSS's answer that the pursuit or acquisition of nuclear weapons produces little to no effects on the democratic state, or even that it actually prevented forms of change, is unsatisfying.

b. Nuclear security studies

As a field, nuclear security studies do not primarily seek an answer to the question of the effects of nuclear weapons on democratic states. Its goal is to explain or understand nuclear weapons politics. However, it does provide a series of findings indicating that nuclear weapons pursuit is related to forms of change in democratic states and, specifically, to the emergence of undemocratic forms of governance. These findings, important in their own rights, allow one to identify a consensus on the fact that nuclear states are somehow different from non-nuclear ones, and that nuclear weapons sit unwell with democracy. They do not, however, provides a clear explanation as to how and why.

First, authors in nuclear security studies have shown that nuclear weapons tend to change how a state does foreign policy. Nuclear weapons, to a certain extent, heavily shape the state's international behavior, and its universe of possible choices.[23] There are many national variations, and not all states behave the same way, but "going nuclear" does appear to modify a state's foreign policy. A second domain where nuclear pursuit seems to affect the politics of democratic states is strategy and military organization. The development by the United States of atomic weapons had important military-institutional effects, including the creation of the Strategic Air Command (1946), the US Air Force (1947), the RAND Corporation, and other national security think tanks. Although the US case remains the most studied one, these phenomena of nuclear adaptation have also happened in other nuclear-armed states,[24] with the implementation of systems of nuclear command and control being the most obvious

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[22] John M. Hobson, *The State and International Relations* (Cambridge: Cambridge University Press, 2000), 176.
[23] Mark S. Bell, "Nuclear Opportunism: A Theory of How States Use Nuclear Weapons in International Politics," *Journal of Strategic Studies* 42, no. 1 (January 2, 2019): 3–28; Mark Bell, *Nuclear Reactions: How Nuclear-Armed States Behave*, (Ithaca [New York]: Cornell University Press, 2021).
[24] Patrick Boureille, "La Marine Française et Le Fait Nucléaire (1945-1972)" (Doctoral Dissertation, Paris, Paris 4, 2008); Simon J. Moody, *Imagining Nuclear War in the British Army, 1945-1989* (Oxford: Oxford University Press, 2020).

form of adaptation.[25] Nuclear technologies pushed armed forces into organizational change. They also led to intellectual change with the emergence of nuclear strategy, which occurred primarily in the 50s,[26] first in the US and USSR, and later in newly nuclear-armed states.[27] There seems to be widespread consensus on the fact that the introduction of nuclear technology invariably predated the formulation of ideas about their use, indicating that nuclear weapons, and not strategic ideas, worked as a driver of change in all of these cases.[28] With the disruption of the balance of power between civilians and the military, they also brought about socio-professional changes in institutions, as more and more civilian thinkers entered the Western militaries, taking charge of a formerly purely military prerogative, namely the design of military strategy and the control of nuclear forces.[29]

Finally, nuclear weapons affect how states do science. Nuclear weapons were the product of the alliance between the US state and scientists, working on a project of unprecedented scale. Donald McLauchlan, looking for "the nature of the connection" between the nuclear revolution and "the nature of that entity – the state – which shepherded in the nuclear age" defines this entity as a "science-intensive national security state".[30] The explosion of interest in nuclear physics and fissile material chemistry made possible the production of new knowledge as well as civilian and military technological innovation. It also led to developments in adjacent fields, such as computer science, first seen as useful only for

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[25] Bruce G. Blair, *Strategic Command and Control: Redefining the Nuclear Threat* (Washington, D.C: Brookings Institution, 1985); Salmá Shāhīn, *Nuclear Command and Control Norms: A Comparative Study* (London: Routledge, 2020).
[26] Marc Trachtenberg, "Strategic Thought in America, 1952-1966," *Political Science Quarterly* 104, no. 2 (Summer 1989): 301–34.
[27] Lawrence Freedman and Jeffrey H Michaels, *The Evolution of Nuclear Strategy*, 4th ed. (London: Palgrave Macmillan UK, 2019); Beatrice Heuser, *Nuclear Mentalities? Strategies and Beliefs in Britain, France and the FRG* (Basingstoke, Hampshire: Palgrave Macmillan, 1998).
[28] For a discussion of this discrepancy, see Benoît Pelopidas and Sébastien Philippe, "Unfit for Purpose: Reassessing the Development and Deployment of French Nuclear Weapons (1956-1974)," *Cold War History* 21, no. 3 (2021): n. 7.
[29] For a history of how civilian control of the US arms force came to be, see Peter Feaver, *Guarding the Guardians: Civilian Control of Nuclear Weapons in the United States* (Ithaca, N.Y: Cornell University Press, 1992).
[30] Gregory McLauchlan, "The Advent of Nuclear Weapons and the Formation of the Scientific-Military-Industrial Complex in World War II," in *The Military-Industrial Complex. Eisenhower's Warning Three Decades Later*, ed. Gregg B. Walker, David A. Bella, and Steven J. Sprecher (New York: Peter Lang, 1992), 103, 101; Gregory McLauchlan and Gregory Hooks, "Last of the Dinosaurs? Big Weapons, Big Science, and the American State from Hiroshima to the End of the Cold War," *The Sociological Quarterly* 36, no. 4 (Autumn 1995): 749–66.

thermonuclear weapons-related equations but with an important impact on policy.[31] The invention of nuclear weapons also affected the relationship between scientists and the state as issues of secrecy and loyalty arose. Nuclear research and data, more so than any other area of science, became shrouded in secrecy.[32] And this is not simply an issue for the Cold War: the complex relationship between nuclear scientists, nuclear programs, and the state is still central in studies of proliferation.[33]

So far, however, these conclusions are non-specific to democratic states. Some authors have sought to look specifically at the connection between democracy and nuclear weapons. In a wide-ranging edited volume, Hans Born, Bates Gill and Heiner Hänggi have concluded the existence of a "clear and widespread deficit of democratic governance of nuclear weapons" in all nuclear-armed states but do not explicitly conclude on an impossible reconciliation.[34] Studies on US nuclear weapons governance have concluded that it might be less undemocratic than one thinks. An example is James Lindsay's study on *Congress and Nuclear Weapons.* In it, he argues that Congress plays a more important role than expected in the making of nuclear policy. Though it is generally unable to cancel programs, it can also play along with existing programs, impose particular ones, and exert influence on how these were shaped.[35] Eric Mlyn's rarely quoted study on *The State, Society, and Limited Nuclear War* develops a similar argument, but based on a different theoretical framework[36]. Mlyn's goal is not merely to estimate what role Congress plays, but to determine how autonomously from society the State can act in nuclear policy. His key finding is that "Congress can affect strategic policy, especially over the long run", because state officials in a democratic state always need to face Congress as it is the place where they can extract resources from society – and therefore face forms of public control.[37]

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[31] Daniel Deudney, *Dark Skies: Space Expansionism, Planetary Geopolitics, and the Ends of Humanity* (New York: Oxford University Press, 2020), 123.
[32] Wellerstein, *Restricted Data*.
[33] Jacques E. C. Hymans, *Achieving Nuclear Ambitions: Scientists, Politicians and Proliferation* (Cambridge ; New York: Cambridge University Press, 2012); Målfrid Braut-Hegghammer, *Unclear Physics: Why Iraq and Libya Failed to Build Nuclear Weapons* (Ithaca ; London: Cornell University Press, 2016).
[34] Born, Gill, and Hänggi, *Governing the Bomb*, 230. Other who pointed to such deficit are Gary Wills, Avner Cohen, or Jayita Sarkar. Garry Wills, *Bomb Power: The Modern Presidency and the National Security State* (New York: Penguin Press, 2010); Cohen, *Worst-Kept Secret*; Jayita Sarkar, *Ploughshares and Swords: India's Nuclear Program in the Global Cold War* (Ithaca: Cornell University Press, 2022).
[35] James M. Lindsay, *Congress and Nuclear Weapons* (Baltimore: Johns Hopkins University Press, 1991).
[36] Eric Mlyn, *The State, Society, and Limited Nuclear War*, (Albany: State University of New York Press, 1995).
[37] Mlyn, 46.

Reading the nuclear security studies literature, one gets the sense that nuclear pursuit did affect the democratic state in some ways, by leading to changes in existing institutions, the creation of new ones, or the development of an undemocratically governed sector inside a state. These findings are based on empirical observation of historical trajectories of contemporary cases and lend credibility to the claim that nuclear pursuit transforms the state. However, no mechanisms have been identified which would allow us to answer the question of how, nor why, this happened. Specifically, it is not clear whether those changes are the result of a causal power attributable to nuclear weapons, or the result of actors' choices.

First of all, this is the case because nuclear security studies adopt different approaches to "the state" and operate without a clear conceptualization of this object. This problem is visible in a review of the field by Gartzke and Kroenig: while calling for studies on "how nuclear weapons affect domestic politics", they refer only to phenomena indirectly related to the state itself such as "government favorability ratings, party support" or "regime stability"[38]. Didier Bigo had identified this as a common bias in political science, namely that the "*state* is often confused with state apparatus and governant", instead of the broader configuration in which they operate.[39] This has several implications, the main one being that it leads to the isolation of institutions from the overall configuration of the state, and the ignorance of their interdependency. This interdependency means that each sector is potentially sensitive to changes occurring in others, defying atomistic approaches focusing on singular institutions. Raymond Boudon names those "interdependent systems", and describes them as prone to emergent effects, which he defines as "an effect which is not explicitly sought by the agents of a system and which results from their position of interdependence".[40] For if nuclear weapons prompt the creation of new institutions, what happens when these interact with existing ones? In that regard, scholars provide hypotheses more than they answer questions. For example, Alex Wellerstein shows that US nuclear weapons affected the

[38] Erik Gartzke and Matthew Kroenig, "Nukes with Numbers: Empirical Research on the Consequences of Nuclear Weapons for International Conflict," *Annual Review of Political Science* 19, no. 1 (May 11, 2016): 409.
[39] Didier Bigo, "Security and Immigration: Toward a Critique of the Governmentality of Unease," *Alternatives: Global, Local, Political* 27, no. 1 (February 2002): 67.
[40] Raymond Boudon, *The Logic of Social Action. Introduction to Sociological Analysis* (London: Routledge, 1981), 59.

practices of secrecy inside the US state but does not consider how these news practices affected democratic control, and the general economy of the US democracy. In line with Norbert Elias' work, the study configuration requires "not just to explore a composite unit in terms of its component parts, but also to explore the way in which these individual components are bonded to each other so as to form a composite unit".[41]

Most importantly, nuclear security studies seem to perceive nuclear weapons essentially as historical objects, without causal properties. Most authors treat nuclear weapons in highly contextual ways which emphasize the role of contingency and actors' agency in historical change.[42] What can be causally attributed to nuclear weapons as material objects remains undetermined, because the causal power of technology is unspecified, or thought to operate only on inter-state relations – nuclear weapons affect the way states interact, but not the way actors or institutions interact together inside a state. Consequently, though it is possible to identify certain changes following nuclear acquisition it does not answer the question of whether this democratic deficit is an inevitable outcome of nuclear weapon pursuit, or the product of contingent historical circumstances.

c. Political theory

Political theorists who confront the issue of nuclear weapons and democratic states, unlike nuclear security studies, do not hesitate to attribute causal power to nuclear technologies, and to argue that these profoundly changed the nature and shape of the states who acquired them. Two main approaches in political theory can be singled out for analysis. The first is a relatively cohesive body of thought, usually named "nuclear one worldism", which argues that the invention of nuclear weapons have transformed nation-states into a "pretense" as none of them can now uphold their basic social-contractual obligation to ensure security. This diagnosis is not specific to democratic states, but it arguably affects them more than their non-democratic counterparts, as it calls into question the nature of the consent given by those

[41] Norbert Elias, *What Is Sociology?* (London: Hutchinson, 1978), 72.
[42] Another issue is that, in existing scholarship, the context is more often than not American. On the "American bias" in nuclear security studies, see Målfrid Braut-Hegghammer, "Proliferating Bias? American Political Science, Nuclear Weapons, and Global Security," *Journal of Global Security Studies* 4, no. 3 (July 1, 2019): 384–92.

governed to a state who cannot fulfill its primary function. The second is a looser body of scholarship, termed "nuclear despotism"[43], that examines the compatibility between ideal conceptions of democratic government and nuclear weapons. Starting from the fact that nuclear weapons are "intrinsically despotic"[44] objects, they conclude at the incompatibility between democracy and nuclear weapons.

These two literature arrive at the conclusion that nuclear weapons have not simply affected the democratic state, they made the nation-state entirely obsolete, while rendering democracy meaningless. Nuclear one worldism and nuclear despotism, unlike nuclear security studies, provide an answer as to *why* nuclear weapons affect democratic states, by attributing a strong causal power to the intrinsic properties of nuclear weapons (destructivity and speed). However, these conclusions are drawn only at the theoretical level, and do not provide empirical observation to back those assertions. As a result, the *how* question remains unanswered, and the ways in which the attributed causal power of nuclear weapons unfold in practice is to be determined.

Nuclear oneworldism, first, constitutes an umbrella term for arguments that equate the invention of nuclear arms with the end of the territorial state as the basic unit of survival.[45] Put simply nuclear one-worldism postulates that the threat of nuclear weapons – caused by their incredible destructiveness and speed – has made any anarchic international system of sovereign states unviable as nuclear weapons "cut to the heart of the state as a war-making entity capable of securing itself" [46]. In this view, the impossibility of defense leaves states more vulnerable than ever and negates the very possibility of sovereignty as traditionally conceived. John Herz argued that nuclear weapons ended the "impermeability" of the nation-state and thus offered "the most radical change in the nature of power and the characteristics of power units since the beginning of the modern state system".[47] Indeed, as noted

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[43] The expression comes from Deudney, *Bounding Power*, 255.
[44] Deudney, 256.
[45] Deudney, 246.
[46] Daniel Deudney, "Political Fission: State Structure, Civil Society, and Nuclear Security Politics in the United States," in *On Security*, ed. Ronnie Lipschutz (New York: Columbia University Press, 1995), 209.
[47] John H. Herz, *International Politics in the Atomic Age* (New York: Columbia University Press, 1959), 22. Herz later changed his mind and nuanced his argument in a 1968 article. However, even then, he maintained the point that the "theory of 'classical' territoriality and of the factors threatening its survival stands" but argued that states might simply evolve toward a "new territoriality" instead of a "state demise" as the role of territoriality in human affairs might decrease due to scientific progress which would solve the problem of scarcity, and as systems of mutual deterrence might ensure stability. In other words, even in 1968, he maintained his diagnosis

by David Gauthier, while states have long been conceived as "gladiators", the metaphor has never been true since states rarely "killed" each other entirely.[48] With nuclear weapons, this changed, hence the argument that a new form of global political organization will have to replace the Weberian state. If these claims are quite consensual among nuclear-one-worldists, they diverge on solutions.

The one-worldist school of thought can be broadly divided into two branches: classical nuclear one-worldism and federal nuclear one-worldism. For classical nuclear one-worldists, such as Herz or Campbell Craig, the effect of nuclear weapons on the state is "simply" to dissolve the notion of domestic space; the Weberian form of the state is not obsolete but has to be radically extended over the whole planet.[49] Daniel Deudney's theory of federal nuclear one-worldism offers a similar diagnosis. Crippled with contradictions, creating a gap between the terms of the social contract (security for obedience) and its material reality (the impossibility of defense against nuclear weapons), the institutional configuration of the state has become a mere "pretense" due to the existence of nuclear weapons.[50] But because a Weberian world state would be dangerous – prone, as it is, to tyranny – Deudney prefers a "negarchical" republican system of federation. Polities must not become a world-state, but a world republican federal system.[51] In both cases, radical extension comes with the obsolescence of the nation-state and, therefore, of the democratic state – which does not mean that other forms of democratic government would exist, but it would take a different form.

Proponents of n*uclear despotism* consider that nuclear weapons, by their mere existence, have made democracy impossible in the nuclear state. This is because, as Daniel Deudney puts it, nuclear weapons are indeed "intrinsically despotic", for three reasons: "the speed of nuclear use decisions; the concentration of the nuclear use decision into the hands of one individual; and the lack of accountability stemming from the inability of affected groups to have their interests represented at the moment of

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but changed his minds about its consequences, John H. Herz, "The Territorial State Revisited: Reflections on the Future of the Nation-State," *Polity* 1, no. 1 (Autumn 1968): 11–34.
[48] David P. Gauthier, *The Logic of Leviathan: The Moral and Political Theory of Thomas Hobbes* (Oxford : New York: Clarendon Press ; Oxford University Press, 1979), 208.
[49] Campbell Craig, "Solving the Nuclear Dilemma: Is a World State Necessary?," *Journal of International Political Theory* 15, no. 3 (October 2019): 362.
[50] Deudney, "Political Fission," 97.
[51] Deudney, *Bounding Power*, 262–64.

nuclear use."[52] Richard Falk and Robert Jay Lifton similarly considered that nuclear weapons creates "a variety of *structural necessities* that contradict the spirit and substance of democratic governance: secrecy, lack of accountability, permanent emergency, concentration of authority, peacetime militarism, extensive apparatus of state intelligence and police" and that their invention "has put a permanent seal of inevitability on the imperial presidency."[53] Elaine Scarry characterizes this situation as a "thermonuclear monarchy".[54]

The reason why nuclear weapons are "monarchic" is that they are "out-of-ratio weapons". This ratio "can be more precisely determined by counting the number of political and military persons involved in the decision and the number of people who are the act's casualties."[55] A bar fight is a one-to-one ratio, while conventional war is probably around one-to-twenty, or perhaps one-to-a-hundred. For nuclear weapons, this ratio is likely one-to-several million. Because "forms of government based on symmetry and distribution of power require weapons that entail symmetry and distribution of power", nuclear weapons produce "an out-of-ratio government whose shape can accommodate the shape of the new out-of-ratio weapon".[56] This asymmetrical form of power reproduces monarchic-tyrannical political arrangements, where a few individuals can decide over the life of the many. In these conditions, "the need for a human presence to fire it is eliminated; and because the human presence is eliminated, the human act of consent is eliminated".[57] What nuclear despotism implies is that democracy, as we know and define it, is impossible in a nuclear-armed state. This state would only be democratic *to a degree*.

Both positions make strong claims about the effects of nuclear weapons on democratic states. They provide an answer as to *why* nuclear weapons can affect democratic government and point to the

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[52] Deudney, 255.
[53] Robert Jay Lifton and Richard A. Falk, *Indefensible Weapons: The Political and Psychological Case against Nuclearism* (New York: Basic Books, 1982), 262.
[54] The opposition between democracy and monarchy may sound dubious to a European mind, but Scarry's point is not that democracy is possible only in a republican form, but rather that nuclear weapons resuscitated classical and pre-liberal form of monarchic power. Scarry, *Thermonuclear Monarchy*, 24–25.
[55] Elaine Scarry, *The Body in Pain: The Making and Unmaking of the World*, First(New York, NY: Oxford University Press, 1987), 154.
[56] Scarry, *Thermonuclear Monarchy*, 14. On this issue of representation, see also Sterre van Buuren, "The Arsenal and the Ballot Box. Exploring the Fundamental Incompatibility of Nuclear Weapons and Democracy" (Forthcoming).
[57] Scarry, *The Body in Pain*, 153.

structural constraints their destructivity creates. But they do so only at the theoretical level and focus on what Philip Abrams called the "state-idea", the "formal abstract object" of the state.[58] They do not discuss the "state-system", that is the "palpable nexus of practice and institutional structure centered in government and more or less extensive, unified and dominant in any given society".[59] Neither approaches provide an answer as to *how* nuclear weapons affect the democratic state, because theoretical considerations are not translated into a research design which would allow for empirical observations on how nuclear weapons acquisition affected democratic states.

Moreover, they focus only on one specific aspect of nuclear politics, nuclear strikes. Since nuclear strikes have – so far – never been authorized,[60] proponents of nuclear despotism and oneworldists focus solely on future issues and ignore the already existing consequences of nuclear pursuit for democratic states. It also means that if luck is on our side and the nuclear age comes to an end without a single additional weapon being exploded over inhabited territories – that is, without any use of despotic power – one could conclude that the democratic costs of nuclearization would have remained virtual. But as Walter Slocombe notes, nuclear politics "embraces not just 'whose finger is on the button' but also who takes decisions on acquiring the weapons, on the shape and scale of the force, on the place of nuclear weapons in the national security strategy, on strategy and doctrine, and on advance planning for possible use."[61] There must therefore be many other aspects of nuclear – and democratic – politics which must be accounted for and investigated.

This general overview prompts the conclusion that the existing literature has not provided a convincing answer as to why and how nuclear weapons might affect democratic states. HSS, with its focus on the international system, passes by the question and arrived at flawed conceptions of the issue. Nuclear

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[58] Philip Abrams, "Notes on the Difficulty of Studying the State," *Journal of Historical Sociology* 1, no. 1 (March 1988): 82.
[59] Abrams, 72.
[60]At the exception of Hiroshima and Nagasaki, even though it is debatable that Truman exerted such power, as his only "decision" regarding the bombings of Hiroshima and Nagasaki seem to have been the choice to spare Kyoto. See Alex Wellerstein, "The Kyoto Misconception: What Truman Knew, and Didn't Know, about Hiroshima," in *The Age of Hiroshima*, ed. Michael D. Gordin and G. John Ikenberry (Princeton: Princeton University Press, 2020), 34–55.
[61] Walter B. Slocombe, "Democratic Civilian Control of Nuclear Weapons," *DCAF Policy Paper*, no. 12 (April 2006): 26; Born, Gill, and Hänggi, *Governing the Bomb*, 228.

security studies provide a set of findings that suggests that nuclear weapons acquisition affects democratic states, and most specifically the workings of democratic government, but fail to explain why or how such change happened. As a result, it is impossible to determine whether those changes can be attributed to the causal power of technology, or choices made by actors. Political theorists have clearly attributed a strong causal power to nuclear weapons, providing a clue as to why states can change when pursuing nuclear weapons. Their answer, however, is insufficiently backed by empirical studies which would permit to observe *how* nuclear weapons transform states, by pointing to specific structural constraints which emerge from the intrinsic properties of nuclear weapons.

2. Nuclear weapons' structural constraints and the road toward restricted democracy

In the aforementioned literature, authors grapple insufficiently with the effects of nuclear weapons pursuit on democratic states. Therefore, in this section, I propose a framework that allow to empirically capture the causal effects of nuclear pursuit on democratic government through their effects on state structures – the "institutional configuration in which political actors operate"[62]. To do so, I focus on nuclear secrecy regimes. I argue, first, that technology can have causal effects by creating structural constraints on individuals, which lead to changes in state structures. One of these changes is the development of regimes of secrecy, a direct result of nuclear weapons' structural constraints in a world deprived of restraints against their use. These regimes are not produced solely by technological constraints, but also by the security-material context in which states evolve, external pressures they undergo, and domestic choices. Nevertheless, technology's constraints constitute the primary and necessary causes behind the development of those regimes. This shows how the nuclearization of a state leads to forms of domestic change. The causal chain can be represented as such:

[62] Vu, "Studying the State through State Formation," 150.

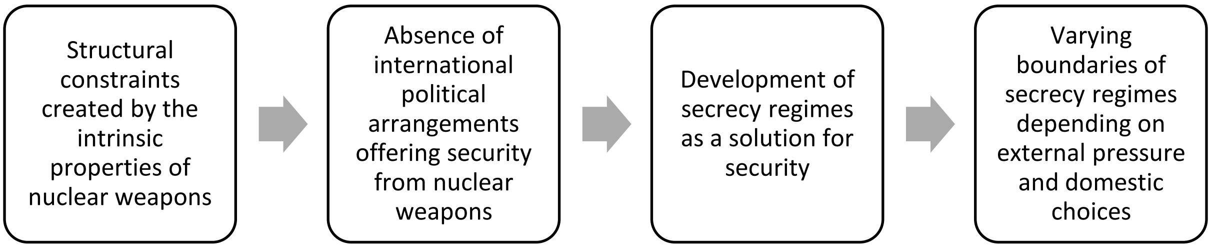

Figure 2 - The causes of nuclear secrecy

a. Technology as a structural constraint

Drawing from social studies on technologies, I propose to conceptualize nuclear technologies as objects with an agentic capacity, whose intrinsic properties pose challenges to actors and force them to adapt. I do not claim that technology has a deterministic role, but rather that it has some form of politics which participates in the making of social life and, more specifically, in the constitution of state structures by creating structural constraints – or opportunities for action.[63] They modify the "environmental possibilism" of actors, the "sort of matrix which limits the operational results of whatever is attempted."[64]

There are different approaches to the question of technology's effects on its environment, two of which are ultimately too simplistic: instrumentalism and determinism. The first, instrumentalism, sees technology as "neutral" and subservient to the actors, their interests, and their values.[65] The problem with this approach is that it ignores the causal role of technology in social life. In that case, as Andrew Feenberg notes, "if technology is neutral, then its immense and often disturbing social and environmental impacts are accidental side effects of progress."[66] Determinism, by contrast, sees technologies as "autonomous", "a destiny which cannot be avoided or escaped" and imposes its politics on human actors.[67] It implies that nuclear weapons have intrinsic properties which translates

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[63] On the notion of agentic capacity, see Jacobsen and Monsees, "Co-Production. The Study of Productive Process at the Level of Materiality and Discourses."
[64] Harold Sprout and Margaret Sprout, "Environmental Factors in the Study of International Politics," *Conflict Resolution* 1, no. 4 (December 1957): 313. On the idea that artifacts can have politics, see Langdon Winner, "Do Artifacts Have Politics?," *Daedalus* 109, no. 1 (Winter 1980): 121–36.
[65] Richard Wyn Jones, "The Nuclear Revolution," in *Fin de Siècle: The Meaning of the Twentieth Century*, ed. Alex Danchev (Londres: I.B. Tauris, 1995), 97.
[66] Andrew Feenberg, *Transforming Technology: A Critical Theory Revisited* (New York, N.Y: Oxford University Press, 2002), i.
[67] Wyn Jones, "The Nuclear Revolution," 98–99.

autonomously into political consequences. They "have been irrevocably invented, and they created their own reality".[68] Many have strongly pushed back against determinism too, cautioning that "one should never take the meaning of a technical artifact or technological system as residing in the technology itself".[69] For Robert Heilbroner, "that machines make history in some sense – that the level of technology has a direct bearing on the human drama – is of course obvious. That they do not make all of history, however that word be defined, is equally clear."[70]

It is worth examining Andrew Feenberg's ambivalent approach to technology for a third approach trying to seize the middle-ground which would restitute the political meaning of technology without overstating its agency over humans. He did so by conceptualizing it as ambivalent, and technical politics as shaped in part by social dynamics.[71] The ambivalent approach hence posits that material factors do constrain actors but only so much as it constrains the universe of choice available to them: "what human beings are and will become is decided in the shape of our tools no less than in the action of statesmen and political movements."[72] The process of nuclear weapons pursuit, in that regard, does not *cause* changes in state structures by virtue of the technology itself, but it rather creates a new environment for actors, which imposes constraints on them. Instead of having agency, as determinism supposes, technology is thought to have an "agentic capacity", that is, the ability to participate in social actions by defining the environment in which actors operate – to "authorize, allow, afford, encourage, permit, suggest, influence, block, render possible, forbid, and so on"[73] – as a result of its intrinsic properties. In that sense, the intrinsic properties of technology do have political implications, but these consequences

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[68] Ken Booth and Nicholas Wheeler, "Beyond Nuclearism," in *Security without Nuclear Weapons? Different Perspectives on Non-Nuclear Security*, ed. Regina Cowen Karp (Oxford: Oxford University Press, 1992), 24. This is, generally, the preferred understanding of nuclear weapons in IR: this model stems from a structural realist conception of nuclear weapons, which considers them as structuring the international system, and the state as adapting or conforming to those systemic constraints. See for example Susan B. Martin, "The Continuing Value of Nuclear Weapons: A Structural Realist Analysis," *Contemporary Security Policy* 34, no. 1 (April 2013): 174–94.
[69] Wiebe E. Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*, (Cambridge: MIT Press, 1995), 6.
[70] Robert L. Heilbroner, "Do Machines Make History?," *Technology and Culture* 8, no. 3 (July 1967): 335.
[71] Andrew Feenberg, "The Ambivalence of Technology," *Sociological Perspectives* 33, no. 1 (Spring 1990): 35–50.
[72] Feenberg, *Transforming Technology*, 3.
[73] Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2007), 72.

are not determined by technology, but co-constituted by the encounter between this technology and the mediation done by actors and contexts.

I make the case for the ambivalent approach which acknowledges technology's agentic capacity and argue that the intrinsic properties of technology have causal power, because they create structural constraints for actors, as their security implications are too big to be ignored. This idea has been already accepted, particularly by proponents of the "nuclear revolution" thesis. What is surprising is the fact that the literature supposes, without much afterthought, that this causal effect exists only at the system-level, but not at the unit-level. The reason why many scholars, although sometimes implicitly, lend agentic capacity to nuclear weapons at the structural level is the fact that their intrinsic properties – an exceptional and unprecedented destructivity, illustrated by Brodie's aphorism that [the atomic bomb] exists and that its destructive power is fantastically great"[74] – interact with a structuring element of the international system, anarchy.[75] My argument is that this agentic capacity exists at the state-level, for states who engage in nuclear programs: the exceptional destructivity of nuclear weapons creates constraints for state actors, that leads to rearrangement of institutions as state officials cope with the security implications of the development, production, deployment, and planned use of nuclear weapons.

"Security" is somewhat of a loaded term. I understand security in the minimalist sense of "security-from-violence" that is, a state of affairs where one is relatively free from the threat of exercise of violent power against their body.[76] The basic variable of "security-from violence" is what Daniel Deudney calls

[74] Bernard Brodie, *The Absolute Weapon. Atomic Power and World Order* (New York: Harcourt, Brace & Company, 1946), 55.

[75] Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon*, (Ithaca: Cornell University Press, 1989), 8. This point is not lost even on critics of the "nuclear revolution". Even though Lieber & Press argue that "[nuclear weapons] do not merit the kind of independent causal properties often assigned to them" (140), they still maintain that abolition is not desirable because it would create a "more dangerous situation: a world of conventional wars and nuclear know-how" (144), which implies that nuclear *did* change something about world politics if the fact that they stop participating in international relation would dramatically change the situation. What critics of the "nuclear revolution" rejects is essentially the "revolutionary" part, the idea that nuclear weapons can fundamentally reorganize the international system's structure. They do not reject the fact that they have an agentic capacity. Keir A. Lieber and Daryl Grayson Press, *The Myth of the Nuclear Revolution: Power Politics in the Atomic Age* (Ithaca, NY: Cornell University Press, 2020).

[76] Following Daniel Deudney and, with him, much of the traditional thinking in Western political theory, I operate from the primary assumption that "security from violence is a basic human interest" because "without it all other human goods or ends cannot be enjoyed". Deudney, *Bounding Power*, 31.

violence-interdependence, “a rough and basic measure of the capacity of actors to wreak destruction upon one another”.[77] When this capacity is low, one is relatively secure but when an actor can without restraint kill another one entirely, the latter is said to be in insecurity. It is, arguably, a restrictive definition. As Jeff Huysmans put it, “Security refers also to a wider framework of meaning (call it symbolic order, or culture or (…) discursive formation) within which we organize particular forms of life”.[78] But the basic pre-conditions for these forms of life to thrive is that material conditions for their existence are sustained, meaning that though security extends beyond material factors that define the level of violence-interdependence, it cannot be defined without them.

Security from violence operates from the assumption that the primary goal of politics in general, and nuclear politics most specifically is *survival*, understood not merely as state survival but as humanity’s survival.[79] Survival is considered a basic need, and therefore a constant that cannot explain variations. Variations in violence-interdependence, however, can explain variations in the security arrangements adopted by actors. The invention of nuclear weapons constitutes such variations, and likely the most consequential one in human history, changing the material structure of human action by introducing the possibility of prompt and utter destruction over an unprecedented scale. Therefore, I expect actors to react to this structural change by seeking arrangements that can provide a certain degree of security against it, meaning that the invention of nuclear created a new constraint for actors. [80]

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[77] Deudney, 18.
[78] Jef Huysmans, “Security! What Do You Mean?: From Concept to Thick Signifier,” *European Journal of International Relations* 4, no. 2 (June 1998): 228.
[79] The assumption of survival as a basic need is common in International relations – Martin Wight has for example wrote that “International theory is a theory of survival” – but it is not neutral (Martin Wight, *International Relations and Political Philosophy* (Oxford ; New York, NY: Oxford University Press, 2022), 37.). Laura Considine has recently argued that operating from the standpoint that nuclear politics was about state survival understood as the avoidance of catastrophe led to conservative outcomes, especially if survival is understood merely as “survival of the state”. Laura Considine, “Thinking through and beyond Survival in Nuclear Politics” (Paper presented at the Nuclear Knowledges Research in Progress Seminar, Paris, May 31, 2023). See also Darel Paul, “Sovereignty, Survival and the Westphalian Blind Alley in International Relations,” *Review of International Studies* 25, no. 2 (April 1999): 217–31.
[80] This approach to security, though far from recent accounts which insists on the discursive nature of security, nevertheless avoids the two pitfalls of rationalist understandings of security. Jutta Weldes and Laura Sheperd have identified those two pitfalls as first an assumption “that an independent reality is directly accessible both to state officials and to analysts” and second that “security requires securing states against objective and external threats.” Looking at security-from-violence from a materialist perspective avoids the first by looking essentially at the vulnerability of people to the ability of others to wreak violence upon them. Security is not defined by the distribution of power, but by the distribution of material capabilities for violence. In that understanding, no one is

For the process through which nuclear weapons pursuit participates in the constitution of state structures, precisely by creating constraints, I use the term *nuclearization*.[81] It describes the process through which a state "becomes nuclear". I argue that one outcome of those constraints is the development of nuclear secrecy regimes inside those states. I do not argue that nuclear weapons produce *only* secrecy, but it will be my focus in this dissertation.[82]

b. Secrecy as an outcome of structural constraints

To observe the variations in state structures which result from nuclearization, I chose to focus on nuclear secrecy regimes. By nuclear secrecy regimes, I mean the set of institutions, rules, procedures and practices implemented to "keep other people from obtaining information you do not want them to have".[83] This definition is based on Wilsnack's concept of information control regimes, which he defines as to "processes used to make sure that certain people will or will not have access to certain information at certain times".[84] Secrecy is one, among other, modes of information control – another being is persuasion, "the process of making sure that other people obtain and believe information you want them to have", or evaluation, "the process of making sure that you learn more from the information you have obtained than just what other people want you to know".[85] Secrecy is therefore an outcome of

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actually secure in a nuclear-armed environment since no one can truly be protected from a nuclear strike. Second, the subject of security-from-violence is not the state but people and their bodies. That people have organized into territorially bounded states to ensure their security is neither a given nor a necessity, but simply an historical data point. Security can emerge from other arrangements as well, and the reasons why it has not is discussed in chapter 2. Security from nuclear weapons could have been the result of an international control over atomic energy, for example, which would have restricted states' sovereignty and, possibly, created a world-scale organization of power. But it has not, and states remained the basic unit of survival, and hence the provider of security-from-violence.Laura J. Sheperd and Jutta Weldes, "Security: The State (of) Being Free From Danger?," in *Globalization and Environmental Challenges Reconceptualizing Security in the 21st Century*, ed. Hans Günter Brauch (Berlin: Springer, 2008), 530.

[81] I define nuclear pursuit as the process through which states seek to acquire nuclear weapons. Whether they actually manage in this task is not directly relevant: Sweden never acquired nuclear weapons, it nevertheless engaged in a process of nuclear pursuit. The difference successful and unsuccessful acquisition is secondary, in the sense that the meaning of nuclear policy changes, but not the fact that such policy existed.

[82] Gabrielle Hecht has shown how the introduction of nuclear power in France has re-arranged the French state, by creating new actors, and re-distributing power inside the state (Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, (Cambridge, Mass: MIT Press, 2009). It is therefore likely that nuclear weapons have changed much more than secrecy regimes, and that the effects of nuclearization might not be unique to nuclear *weapons*.

[83] Richard W. Wilsnack, "Information Control: A Conceptual Framework for Sociological Analysis," *Urban Life* 8, no. 4 (January 1980): 471. I would like to thank Daniel Salisbury for suggesting this reference to me.

[84] Wilsnack, 468.

[85] Wilsnack, 473, 475.

information control regimes, but not the only one. However, it is the one on which I will focus, and therefore will use the terms “information control regime” and “secrecy regime” interchangeably. By secrecy regimes, therefore, I do not refer to specific secrets, but to specific regimes which organize the distribution of nuclear knowledges inside a state.

The relationship between secrecy and nuclear policy is almost symbiotic in the sense that the two have, historically, been linked since the very beginning. Nuclear weapons were “born secret” and never left the realm of secrecy since they were invented.[86] At a theoretical level, it makes intuitive sense that nuclear weapons should be governed in secrecy as they are too dangerous to be unproperly managed. As Deudney notes, nuclear weapons are “so dangerous that they require regulation and control by highly hierarchical ‘total’ institutions.”[87] Moreover, since the nuclear arsenal constitutes a primary target for a nuclear conflict, transparency might risk inviting rather than deter a nuclear conflict. Any obvious vulnerabilities could lead an adversary to believe they have a chance of inflicting a fatal first strike. Their mere existence proves the possibility that the security advantage that one enjoys could fall into an adversary’s hands if the technology’s “secrets” were not concealed properly. As Barry Buzan observed, “because deterrence is influenced by technological variables, it cannot escape being vulnerable to the continuous pressure of qualitative advance” which logically justifies the need to safeguard such advance via secrecy.[88] On this basis, I argue that the security implications of nuclear knowledges create a structural constraint in favor of secrecy.[89]

By nuclear knowledges, I mean all forms of knowledges related to a state’s nuclear weapons policy, from the technical data related to the production of nuclear weapons related technologies to assessment driving policy choices, as well as those choices themselves. Nuclear secrecy is a continuum, from technical secrets which founded the existence of the secrecy regime, to political secrets which are a matter of domestic political choices, passing by many nuances of knowledges kept secret for security-

[86] Peter J. Westwick, “In the Beginning: The Origin of Nuclear Secrecy,” *Bulletin of the Atomic Scientists* 56, no. 6 (November 2000): 43–49.
[87] Deudney, *Bounding Power*, 256.
[88] Buzan, *An Introduction to Strategic Studies*, 216.
[89] Actors could also be incited to spread false information, but this strategy would only have worked if they had kept secret the one “true” information they wished their adversaries did not know.

related reasons. The norms, procedures and practices created to control the diffusion of technical information constitute the basis for political secrecy by making a number of institutional resources available for state officials desiring to extend the boundaries of secrecy beyond what they considered necessary for security. For this reason, I find more productive not to assume a distinction between technical and political forms of nuclear knowledges, and simply assume that all forms of nuclear knowledges have political implications.

There is a tendency, in the existing literature, to establish a distinction between technical and political forms of secrecy. Daniel Salisbury is explicit in accepting this differentiation, when he writes that his analysis "is primarily concerned with the secrecy surrounding policy, rather than technical, information", the former being defined by "basic information about the UK's nuclear decisions, nuclear delivery platforms, number of warheads and even the basic rationales for the possession of nuclear weapons or choice of particular systems".[90] Alex Wellerstein accepts it too, albeit implicitly, by leaving consideration of democratic politics outside of his analysis of the US technical secrecy regime. In doing so, he relies on the unspoken assumption that it is possible to distinguish technical and political secrecy.[91] Annette Schnapper and Harald Müller similarly set a boundary between information of technical nature – such as "the isotopic composition of weapons' plutonium" – and other of more political nature – such as the ones diplomats can exchange to establish trust.[92]

Though intuitive, this distinction is flawed. It assumes certain ontological differences between different types of knowledge, which justifies the use of different categories. It makes sense: the design of a centrifuge, for example, is incomparable to information regarding a state's nuclear strategy, though both would constitute nuclear knowledges by my definition. Though incomparable, both share similarities. First, they are both relevant to nuclear policy. though the content of a centrifuge blueprint is not a topic for democratic deliberation, its existence is. Indeed, technical secrecy also conceal political choices,

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[90] Salisbury, *Secrecy, Public Relations and the British Nuclear Debate*, 15.
[91] At the exception of his conclusion, in which Wellerstein faces the question of democracy. Wellerstein, *Restricted Data*, 399–405..
[92] Annette Schaper and Harald Müller, "Torn Apart: Nuclear Secrecy and Openness in Democratic Nuclear-Weapon States," in *Democracy and Security. Preferences, Norms and Policy-Making*, by Matthew Evangelista, Harald Müller, and Niklas Schoerning (New York: Routledge, 2009), 149–50.

notably the choice to develop a certain technology. As outputs of public policy, they are of concerns for the public. Moreover, though the inner workings of a centrifuge are not democratically relevant, knowing the production cost, quantity produced, and maximum output of any model most certainly is. All these details can only be known through the technical details. Establishing a substantial distinction between technical and political knowledges is not particularly clear-cut.

Second, both kinds of secrecy are being maintained by the same regimes, as I will show in later chapters. It does not mean that, inside these regimes, there is not some kind of hierarchy. For example, the British distinction between "atomic energy information" and "information on atomic energy" implied a division of labor, with the former being under the control of the Declassification Committee, and the latter being released under Ministerial approval only.[93] Similarly, around test sites, French officials established a hierarchy between what could be told, and what should be kept secret at any cost.[94] The publics of secrecy also varies largely: after 1958, US officials suddenly become privy to most British technical secrets, and vice-versa, while both countries would continue to hide this information from their domestic public view, as well as from other international actors.[95] This, however, does not imply the existence of two different secrecy regimes but rather, of a single regime with internal specificities.

c. Nuclearization as a multi-causal process

I have, so far, focused on structural constraints as causes for nuclear secrecy regimes development. Unlike an instrumentalist view, an ambivalent approach holds that technology's agentic capacity is necessary to explain outcomes. An ambivalent approach necessarily supposes the intervention of other factors, including human agency. Unlike a determinist view, it would not consider this to be a sufficient condition for the outcomes. Other factors must be accounted for, meaning that nuclearization is a multi-causal process. In this subsection, I propose three secondary factors necessary for understanding how and why nuclear secrecy regimes developed.

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[93] Letter from R.E France to D.A. Shirlaw, 10th February 1953, AB 8/212, TNA.
[94] See chapter 5 for evidence.
[95] See John Baylis, "Exchanging Nuclear Secrets," *Diplomatic History* 25, no. 1 (January 2001): 33–61.

The first factor that must be accounted for is the influence of *the external environment on actors' behavior*. The external environment exerts two forms of influence. First, it participates in defining nuclear technology's meaning for states. Here, I follow Daniel Deudney's historical security materialism, which he defines as "the project of understanding the relationships between different authoritative political arrangements (structure), different material contexts composed of geography and technology (material), and security-from-violence (security)."[96] It argues essentially that existing material forces, and most specifically forces of destruction, determine the kind of viable security structures which can emerge in a certain context.[97] Whether, and how, these forces of destruction are restrained defines the nature of the structural constraints they pose on states. As Deudney writes, "Once nuclear fission has been discovered, we live in a nuclear material context whether or not any nuclear weapons (technics) actually exist", but "whether these destructive possibilities are realized as technics depends upon which configuration of socially constructed restraints (or lack thereof) are present".[98] The constraints of nuclear technology are thus not fixed and unmediated, but dependent on the kind of restraints existing in a given system. If, for example, an international control for atomic energy had existed since 1945, there would have been no need for state secrecy over nuclear knowledges, since other forms of restraints would have offered security from nuclear weapons. The *security-material context* thus forms the "causal field" in which actors operate, "the set of circumstances and background conditions that are important or necessary in explaining a phenomenon".[99] It links the intrinsic properties of destructive technologies with politics and defines the nature of the structural constraints of technology. It also implies that their meanings can change over time, depending on the nature of existing forms of restraints.

The second kind of external factor is the states' international relations, and the *external pressures* they are submitted to. Peter Gourevitch has argued that a state's domestic politics is always partly shaped by

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[96] Deudney, *Bounding Power*, 280, fn. 10.
[97] Daniel Deudney, "Geopolitics as Theory: Historical Security Materialism," *European Journal of International Relations* 6, no. 1 (March 2000): 77–107.
[98] Deudney, *Bounding Power*, 295–96, fn. 46.
[99] Gary Goertz, *Contexts of International Politics*, (New York, N.Y: Cambridge University Press, 1994), 16.See also John L. Mackie, *The Cement of the Universe: A Study of Causation* (Oxford: Oxford University Press, 2002), chap. 2.

external factors, be it the international system or the specific actions of a more powerful actors.[100] The nuclear politics of weaker actors is partly defined by the politics of stronger actors. For example, the US and USSR's decision not to agree on a regime of control of atomic energy pretty much decided the faith of such restraints, as France, the UK, or Sweden, would have been unable to uphold an international regime by themselves. But there is more. Because nuclear politics cannot be contained within the boundaries of domestic states – as their consequences will impact other actors in the system – it is tempting for the hegemon to maintain its security by imposing its will on other states. In the case of the United States and European states, this has been studied primarily with non-proliferation policies, the United States trying to prevent its allies from acquiring these weapons or, when impossible, to shape their nuclear policy.[101] But US policies also affected states secrecy regimes. In 1946, US policymakers decided to abandon international control, secrecy became the favored form of restraint against nuclear violence. But secrecy cannot prevent other states from discovering by themselves the basic knowledges necessary for nuclear production. Preventing the spread of nuclear weapons to US enemies also required dictating allies how to control their own nuclear knowledges. This hegemonic diplomatic pressure does not primarily explain why states develop secrecy regimes, but it explains why they sometimes went beyond what they considered necessary in security terms, and thus explains their shape. Hegemony, as Mikael Nilsson has argued, is akin to a consented relation, "a relationship in which one consents to the leadership of another because it is beneficial".[102] The US, therefore, did not *impose* secrecy. As John Krige writes, "Hegemony is not a force that is deployed and that determines or dictates outcomes".[103] Rather, allies consented to secrecy reforms because they considered that they could be beneficial for them. The level of pressure a state is submitted to determines the shape of its secrecy regime – France, for example, was able to escape US pressure relatively well, while the UK did not.

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[100] Peter Gourevitch, "The Second Image Reversed: The International Sources of Domestic Politics," *International Organization* 32, no. 4 (1978): 881–912.

[101] There is a lot of literature on this topic, but the most recent and thorough contribution is Jonathan R. Hunt, *The Nuclear Club: How America and the World Policed the Atom from Hiroshima to Vietnam* (Stanford, California: Stanford University Press, 2022).

[102] Mikael Nilsson, *Tools of Hegemony: Military Technology and Swedish-American Security Relations 1945-1962*, (Stockholm: Santérus Academic Press, 2007), 32.

[103] John Krige, *American Hegemony and the Postwar Reconstruction of Science in Europe*, (Cambridge, Mass: MIT Press, 2006), 9.

Finally, there are internal factors since ambivalence do not deprive actors of their agency. *Domestic choices* also explain why different states' secrecy regime can take different shapes. Actors have different choices when facing a constraint,. For example, France and the UK developed particularly autonomous secrecy regimes, with their own rules of information control, which led to a sort of state within the state. Sweden, by contrast, kept relying on conventional practices of information control to maintain secrecy over nuclear research. Similarly, state officials can transform a constraint into an opportunity, transforming the eventual outcome. In France, for example, the secrecy surrounding nuclear research offered the opportunity to fully conceal the nuclear program from the public. In that case, though the primary cause of secrecy was technology's structural constraints, its boundaries must be explained by actors' choice. At the same time, public demands for transparency can also lead to adaptation in the secrecy regime to meet those demands.

In this section, I have argued that the structural constraints created by nuclear weapons, which stemmed from their exceptional destructivity and the vulnerabilities they create, lead to re-arrangement in state structures. Pursuing nuclear weapons is not simply a process of material acquisition, but also of political change, which I term nuclearization. Most specifically, nuclearization leads to the emergence of new regimes of secrecy, aimed at keeping a control over a state's nuclear knowledges. These regimes are not to be explained solely by the structural constraints of technology. The security-material context, first, defines how those constraints will act over states. Then, external pressures and actors' choices also are needed to explain why and how states developed nuclear secrecy regimes. Nevertheless, I argue that structural constraints are a necessary mechanism to explain why states developed secrecy regimes as they engaged in nuclear pursuit: not because they wanted to, but because they had to. In the next section, I look at the implications of this assertation for democracy in the nuclear state.

3. Nuclearization and the rise of restricted democracies

In this section, I look at how nuclear secrecy regimes affect democratic government. I argue that the development of nuclear secrecy regimes leads to the rise of *restricted* democracies, because secrecy constitutes a restriction to the public's ability to control state actions. Though this is not enough to warrant the claim that nuclear secrecy abolishes democracy, the case will be made that it transforms the

nature of democracy by restricting the boundaries of democratically governed state actions. Nuclear weapons do not dissolve democracy, but they do lead to the rise of states where the autonomy of state officials is massive in a particular policy domain of policy of existential importance for the public. Nuclear-armed democracies are therefore political systems in which the public can exert control over state actions in most domains, but not the one which engages its very existence to the fullest. First, I define democracy and underline the importance of public control over state actions in democratic theory. Then, I outline three modes of democratic control, which are deliberation, oversight and accountability and show how they can all be affected by regimes of secrecy. I argue that secrecy flaws deliberation over political choices by not making available certain pieces of information necessary to judge an action and its justification; limit oversights by concealing certain state actions from controllers; and create a lack of accountability over the long-term. My argument is summarized in the following figure:

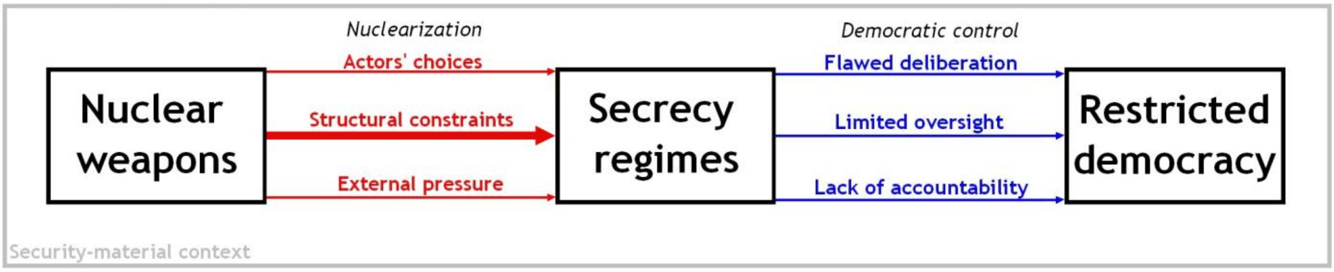

Figure 3 - The process of nuclearization. Causes and consequences.

a. Democratic control in the nuclear state

I define the democratic state as a state whose structures allow for the public to exert control over state actions, that is, actions carried out in the (legal) name of the state by officials. The democratic nature of a regime depends on how its state structures allow, or deny, the public to participate in the making of politics and, more specifically, to control the choices and actions carried out in the name of the state.

I am following Giovanni Sartori in defining "democracy" primarily as "political democracy", that is, something less ambitious than social or economic democracy: "First things must come first; and political democracy as a method, or as a procedure, must precede whatever substantive achievement we may

demand from a democracy."[104] Defining democracy as a *procedure* implies, therefore, excluding approaches that would define the democratic nature of a state based on the outcomes of policy, or on the respect of certain values.[105] This implies defining democracy without reference to liberalism, which implies a standard of rights and values whose respects conditions good government. To the contrary, as Nadia Urbinati puts it, democracy "takes conflict channeled through procedures and political institutions as a norm of participation and *not for the results it promises*, (…). Democracy *is* its procedures, with the caveat that there is nothing external to it that can evaluate the substantive quality of its decisions".[106] If there exist no external criteria to evaluate the outcomes, then, to evaluate the democratic nature of a state implies finding external criteria to evaluate its political institutions and procedures. This means establishing minimal standards which defines democratic government.

According to Robert Dahl, seven criteria define modern democracies: control over policy decision exerted by elected officials; fair and regular elections; (quasi-)universal right to vote; (quasi-)universal right to compete for office; freedom of expression; freedom of information and freedom of information.[107] All these can be subsumed into one main point: representative democracy is about allowing the democratic public, defined as all the citizens of a given state, to *participate* in the making of, and to *contest*, state actions.[108] Simply put, democracy is about mechanisms which allow the democratic public to *control* state actions in various ways. This is, arguably, a restrictive definition of democracy, but one which focuses on what Philip Pettit considers to be "central to the notion of democracy": the idea of "giving maximal or at least significant control over government to the people"

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104 Giovanni Sartori, *The Theory of Democracy Revisited. Part One: The Contemporary Debates* (Chatham, N.J: Chatham House Publishers, 1987), 11. This does not mean that I consider economic or social factors as irrelevant to democratic government, but rather that political democracy constitutes a basic pre-condition and therefore the object of my focus.
105 Which differentiates it from "nuclear despotism" which points to the incompatibility between nuclear weapons and (liberal) democratic values and rights.
106 Nadia Urbinati, *Democracy Disfigured: Opinion, Truth, and the People* (Cambridge, Massachusetts: Harvard University Press, 2014), 77. (emphasis added)
107 Dahl, *Dilemmas of Pluralist Democracy*, 10–11.
108 Robert A. Dahl, *Polyarchy; Participation and Opposition* (New Haven: Yale University Press, 1971), 6. These criteria are also the ones used as defining components of democratic regimes in Boix, Miller & Rosata Data Set of Political Regimes. Carles Boix, Michael Miller, and Sebastien Rosato, "A Complete Data Set of Political Regimes, 1800–2007," *Comparative Political Studies* 46, no. 12 (2012): 1527.

through various mechanisms.[109] For John Dewey, similarly, "all that is relevant to *political* democracy" are the modes of "selecting officials and regulating their conduct as officials".[110]

As Dahl defined it, control implies "[a] relation among actors such that the preferences, desires, or intentions of one or more actors bring about conforming actions, or predispositions to act, of one or more other actors."[111] In modern representative democracies, control over policy choices made and implemented by state actors is not exerted directly. It is mediated by various institutions and mechanisms, such as Parliament or Courts, or more diffuse forms of contestations. [112] When these allow for citizens to exert control over state actions, that is actions carried out by an official which is to be attributed to the authority and power of the state, then the state can be deemed democratic.[113] By state officials, I mean all actors from the executive and administrative branches of the state whose acts possess a certain authoritative legal power that makes them "official".[114] A democracy whose institutions

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[109] Philip Pettit, "Three Conceptions of Democratic Control," *Constellations* 15, no. 1 (2008): 46.
[110] John Dewey, *The Public and Its Problems: An Essay in Political Inquiry* (Athens, Ohio: Swallow Press, 2016 [1927]), 121.
[111] Dahl, *Dilemmas of Pluralist Democracy*, 16–17.
[112] Therefore, I stay away from a Schumpeterian "minimal" definition of democracy which reduces it to competition over people's votes, or Przeworski et al. minimalist definition of democracy as "a regime in which those who govern are selected through contested elections", as these do not include deliberations, and reduce accountability mechanisms to election. (Adam Przeworski et al., *Democracy and Development: Political Institutions and Well-Being in the World, 1950-1990*, (Cambridge: Cambridge University Press, 2000), 14.) This implies a differentiation with "guardianship" approaches which dissolve the issue of democratic nuclear policy-making by pointing to the elected nature of decision-makers, an insufficient criteria for democracy.
[113] This conception of state action is directly inspired by O'Donnell, for whom "the decision made by a given individual only becomes imputed as a state act because certain rules define that such an act by such an individual, having fulfilled certain legally prescribed requisites, qualifies as an "official" (i.e. state) decision." (Guillermo A. O'Donnell, *Democracy, Agency, and the State: Theory with Comparative Intent* (Oxford ; New York: Oxford University Press, 2010), 119.). Such approach is very similar to Bourdieu's, for whom state power derived from the "impersonal network of a long chain of mandated plenipotentiaries who are answerable to a superior from whom they receive their authority and their power, but also, to some extent, answerable for him and for the orders they receive from him and which they monitor and ratify by executing." Pierre Bourdieu, "From the King's House to the Reason of State: A Model of the Genesis of the Bureaucratic Field," *Constellations* 11, no. 1 (March 2004): 32.
[114] MPs, for example, are not state officials as they do not possess such authoritative power. Members of government, however, are because they occupy a certain office, and therefore exert certain power which are backed by authoritative legal power – for example the ability to sign decrees. This is arguably a simplification, and John Dewey has argued that officials and government should be distinguished as "government is not the state, for that includes the public as well as the rulers charged with special duties and powers." (Dewey, *The Public and Its Problems*, 78.) In a sense, the government is supposed to exert control over the administrative power and the Weberian "bureaucracy" in the name of the people. This dimension of control, however, is left aside in this dissertation and government members and administration officials will be treated indifferently as executor of a mandate of delegated power.

deprive citizens of control over certain state officials would become restricted – and, after a certain point, non-existent.

b. Modes of democratic control and their relation to secrecy

Different modes of democratic control can be identified. The most obvious one is the electoral process, through which the public directly or indirectly controls who gets to hold an office. However, this mode of control will be left out of my analysis as nuclear issues rarely feature on the top of the citizens' lists of priorities when electing a new government.[115] Rather, I will focus on other modes of control, namely *deliberation* (public debates and votes over future choices and their justifications), *oversight mechanism* (mechanisms of control over the implementation of an ongoing policy) and *accountability* (mechanisms of *a posteriori* control over the correspondence between past state actions, their justifications, and their achievements).[116] The exercise of these modes of control depends on a state's domestic arrangements because, as Robert Goodin noted, "what people want to do, and *what they can do*, depends importantly upon what organizational technology is available or can be made readily available to them for giving effect to their individual and collective volitions."[117] Information control regimes can therefore affect the level of democratic control in a positive and a negative manner, notably by creating obstacles to such control, or simply not offering the opportunity to exert control.

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[115] This do not mean that the general public does not *care*, nor does not *know* much about nuclear issues. However, these "rarely rank among the top policy priorities of survey respondents". Fabrício M. Fialho, "Measuring Public Knowledge on Nuclear Weapons in the Post-Cold War: Dimensionality and Measurement Invariance across Eight European Countries," *Measurement Instruments for the Social Sciences* 3, no. 1 (December 2021): 3. See also Ward Wilson, "Why Are There No Big Nuke Protests?," *Bulletin of the Atomic Scientists* 71, no. 2 (January 2015): 50–59; Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, chap. 7.

[116] There exists a tendency in the literature to subsume all those forms of control under the vocable of "accountability". (See, for example, Genevieve Lester, *When Should State Secrets Stay Secret?: Accountability, Democratic Governance, and Intelligence* (Cambridge: Cambridge University Press, 2015); Wolfgang C. Müller, Torbjörn Bergman, and Kaare Strøm, "Parliamentary Democracy: Promise and Problems," in *Delegation and Accountability in Parliamentary Democracies* (Oxford: Oxford University Press, 2003), 3–32.) In his study of the meaning of accountability in modern democracies, Robert Mulgan disagrees with such view. Accountability is just one form of control, "an essential part of a functioning system of institutional control but it is not the whole of that system". (Richard G. Mulgan, *Holding Power to Account: Accountability in Modern Democracies* (Houndmills, Basingstoke: Palgrave Macmillan, 2003), 19.) Reducing control to accountability would imply that the only form of control over the executive would be retrospective, and in certain cases, would be limited to elections.

[117] Robert E. Goodin, "Institutions and Their Design," in *The Theory of Institutional Design* (Melbourne: Cambridge University Press, 1996), 13. (emphasis added)

For these modes of control to be effective, two conditions must be met. The first is that mechanisms of control must be actionable. If no actor is allowed to exert oversight over a certain policy, for example, then there is no control. Similarly, if an actor can deliberate but is not presented with a choice between different policies, there is no control. This implies the possibility to *participate* in control. Second, there must be a satisfactory access to information about state actions, whether current, past or future, to offer the possibility of *contesting* them. The relationship between the public and the state is one of delegation. The public delegates power to rule to state officials under the condition that they act according to their preference. As such, delegation is akin to a principal-agent relationship, where the principal is dependent upon an agent to serve its interests and thus require information about the agent's action or plans for action to ensure the correspondence of these with its interests.[118] Absent necessary information, the principal becomes "unable to infer the appropriateness of the agent's actions" and such a situation "pervades policymaking".[119] This is true of all three modes of control. As Gutmann and Thompson assert, "the reasons that officials and citizens give to justify political actions, and the information necessary to assess those reasons, should be public" for deliberation to be meaningful.[120] Similarly, Mulgan considers "the right to demand information" the basic pre-condition for a relation of accountability.[121] Lester also considers that "a break in the smooth delivery of (…) information can cause external oversight mechanisms to break down completely" by depriving the controllers from means of control.[122] Absent satisfactory information about the object under control, it is impossible to draw proper conclusion on it.

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[118] Such conception of the legislative/executive relationship as being a principal-agent relationship is put forth by Thomas Saalfeld or Müller et al. Müller, Bergman, and Strøm, "Parliamentary Democracy: Promise and Problems"; Thomas Saalfeld, "Executive-Legislative Relations in Europe," in *Routledge Handbook of European Politics*, ed. José M. Magone (London ; New York: Routledge, 2015), 346–65.
[119] D. Roderick Kiewiet and Mathew D. McCubbins, *The Logic of Delegation: Congressional Parties and the Appropriations Process*, (Chicago: University of Chicago Press, 1991), 25–26.
[120] Amy Gutmann and Dennis F. Thompson, *Democracy and Disagreement* (Cambridge: Belknap Press of Harvard University Press, 1996), 95.
[121] Mulgan, *Holding Power to Account*, 11.
[122] Lester, *When Should State Secrets Stay Secret?*, 15.

Table 1 - Conditions for effective democratic control

Modes of control	**Conditions for effective democratic control**
Deliberation	Ability to deliberate and to obtain accurate information about the justifications and costs or implications of planned state actions.
Oversight	Ability to participate in oversight and obtain accurate information about ongoing state actions.
Accountability	Ability to obtain *a posteriori* accurate information about state actions, and their correspondence with given justification and announced costs.

If even one, or several, of those conditions are not met, and this absence can be imputed to mechanisms created by the nuclear secrecy regime, then democratic control over nuclear policy will not be deemed democratic as a result of nuclearization. My interest is solely in establishing that fact, and not in making the case that nuclear-armed democracies are *more or less* democratic than non-nuclear armed ones. Rather, I seek to determine what causal effects can be attributed to nuclearization, and how those affects democratic control.

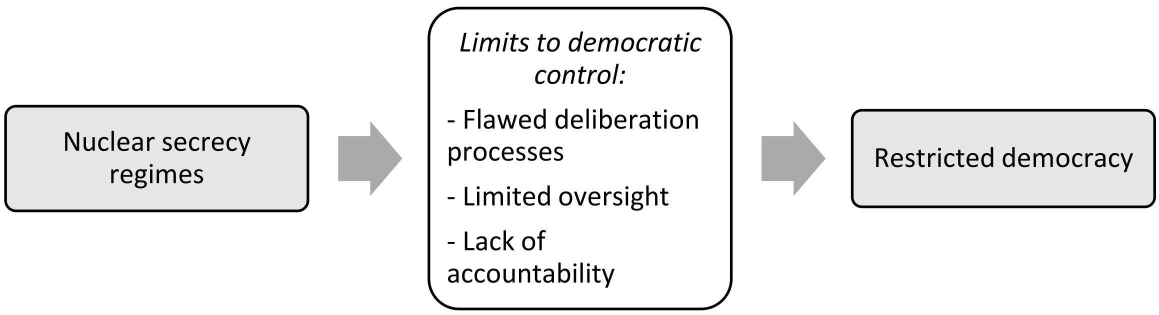

Figure 4 - Process of democratic restriction

Two caveats must be made here. First, do I mean that secrecy can never be accepted in a democratic state? Dennis Thompson argued that a balance between secrecy and control could be found with the criteria that secrecy over political choices is acceptable when it better serves the policy goal than publicity, when secrecy is agreed upon after deliberation, and when *a posteriori* control is possible. Even in such a situation, however, Thompson acknowledged that this procedure would only "diminish the damage" to democratic governance and not fully solve the problem of democratic secrecy.[123]

[123] Dennis F. Thompson, "Democratic Secrecy," *Political Science Quarterly* 114, no. 2 (June 1999): 181–93.

Drawing on Thompson, Sagar adds that "democratic mechanisms are necessary but not sufficient to combat the abuse of state secrecy because their efficacy depends on access to secret information".[124] Secrecy can therefore constitute a serious limit to the effectiveness of democratic control mechanisms by concealing certain elements from public view and therefore flawing the effectivity of control mechanisms, regardless of its legitimacy. This means that, even if secrecy surrounding nuclear policy is legitimately justified by the security implications of nuclear technology, it does not cease to be an issue for democratic control.

Second, I admit that access to information is far from sufficient to ensure *efficient* control. Other factors matter too, notably the autonomy of the controller from the controlled, and the existence of a desire to exert such a control.[125] The degree to which the public exerts its right of control is important, but not directly relevant to the question of secrecy's effects. Putnam et al. noted that good institutional design was not sufficient for good institutional performance as other factors must be present – in their case, the civic-ness of the population.[126] If controllers relinquish the exercise of their duty of control, it can be the result of other factors, linked to the epistemic authority of experts, the problem of executive deference, or more contingent factors.[127] Though important, these factors are only indirectly related to the problem of secrecy. For example, sometimes, MPs may simply not *want* to be involved in certain policy issues even though they could. While I will show how secrecy can produce the informal exclusion of Parliament from its scrutiny role, I do not claim that secrecy regimes explain all cases of Parliament's

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[124] Rahul Sagar, "On Combating the Abuse of State Secrecy," *Journal of Political Philosophy* 15, no. 4 (December 2007): 427.

[125] Some add other factors, notably the possibility of effectively sanctioning the agent if the principal is displeased with the results (Mulgan, *Holding Power to Account*, 9.). The sanction criterion is debated, and some prefer a less demanding requirement of justification when it comes to democratic accountability. Instead of being able to directly sanction the executive, the public should be able to compel it to justify itself. It is the position held notably by Philp (Mark Philp, "Delimiting Democratic Accountability," *Political Studies* 57, no. 1 (March 2009): 32.Lester considers other criteria related to "knowledge conditions" related to control mechanism, notably the issue of controllers' competencies who must "be able to interpret the programs that are presented". This issue, however, is not directly relevant to secrecy regimes, since the lack of competence on the controllers' sides is in some sense the product of their own turpitudes. Lester, *When Should State Secrets Stay Secret?*, 15.

[126] Robert D. Putnam, Robert Leonardi, and Raffaella Nanetti, *Making Democracy Work: Civic Traditions in Modern Italy* (Princeton, N.J: Princeton University Press, 1993).

[127] On the epistemic authority of experts, see Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, chap. 7. On the problem of executive deference see Lindsay, *Congress and Nuclear Weapons*, 7–9. On the Parliament reluctance to sometimes exert its duty of scrutiny, see Greg Power, "The Politics of Parliamentary Reform: Lessons from the House of Commons (2001–2005)," *Parliamentary Affairs* 60, no. 3 (January 1, 2007): 492–509 ; Mulgan, *Holding Power to Account*, 59–63.

unwillingness to exert control. However, I claim that it affects the potentialities of parliamentary control over nuclear policy by creating structures in which the public is not in possession of the mean necessary to exert control over state actions. It makes the public vulnerable to abuses of state secrecy, though not necessarily victim to it.

c. Nuclear-armed democracies as restricted democracies

What happens when nuclear secrecy flaws the exercise of modes of democratic control? It produces, I argue in this subsection, restricted democracies. By *restricted democracy*, I mean states who still satisfy basic criteria for democratic government – elections, freedom of speech, association… - but where certain domains of government are ultimately left outside of the public sphere due to internal factors.[128] In a restricted democracy, citizens are ultimately deprived from the means of actual self-government. Through secrecy regimes, nuclear issues are placed outside the domain of democratically controllable issues. And, because secrecy regimes are a product of technological constraints, these limits set on democratic government stem primarily from material constraints. Nuclear weapons, to a certain extent, produce their own modes of control, and these are not compatible with democratic government. Although state actors can make different choices, and possibly resist external pressures, they cannot escape the structural constraints of nuclear technology. Moreover, these constraints create opportunities for actors to conceal more than what is necessary for security, leaving open a door to abuses of secrecy.

One could argue that, in the end, all democracies are limited, and therefore that my argument is not particularly startling. Pierre Rosanvallon, in line with most of classic liberal thought, described democracy as "a political form incomplete by definition".[129] Robert Dahl identified two mains limits

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[128] The concept was used in the literature on democratization, particularly in the 90s, to refer to a "a civilian government elected under reasonably fair conditions, but with significant restrictions in participation, competition, and/or the observance of civil liberties." (Scott P. Mainwaring, "Democratic Survivability in Latin America," in *Democracy and Its Limits: Lessons from Asia, Latin America and the Middle East*, ed. Howard Handelman and Mark Tessler (Notre Dame: University of Notre Dame Press, 1999), 11–68.) In these conceptions, the restrictions on participation or competition were understood to stem either from censorship, police violence, or state decay. Colombia, before the 1990s, constituted an example of a "restricted democracy". Ana María Bejarano and Eduardo Pizarro, "From 'Restricted' to 'Besieged'. The Changing Nature of the Limits to Democracy in Colombia," in *The Third Wave of Democratization in Latin America. Advances and Setbacks*, ed. Frances Hagopian and Scott P. Mainwaring (Cambridge: Cambridge University Press, 2005), 235–60.

[129] Rosanvallon, *Democracy. Past and Future*, 204. The idea of democracy as a naturally limited form of self-government is widely admitted, both in a historical and theoretical perspective. See Przeworski, *Democracy and the Limits of Self-Government*; Dunn, *Setting the People Free*.

which would prevent the realization of democracy's "true" definition over a large-scale: that "the government of a country cannot be highly participatory, and the average citizen cannot have much influence over it."[130] This, however, should not diminish our concerns over limits set by nuclearization over democratic government. First, the limits Dahl evokes are fundamentally linked to the form of representative government. Citizens agree to them because they are necessary to make representative government possible over a large-scale community. In the case of nuclear weapons, these limits are imposed by a technology that is in no way necessary for democracy. These are not natural limits, but artificially imposed restrictions. Moreover, citizens do not even have the possibility of choosing whether, and how, these limits should exist, since they do not have proper control over nuclear issues. Not only are the limits unjustifiable in terms of necessity, but they also cannot be justified in terms of consent.

Second, and most importantly, though many domains of state actions are not democratically controllable, none are as important as nuclear policy. Nuclear weapons, by nature, engage the level of violence a state is ready to exert on its population, and the population of other states, on behalf of its citizens. Peters et al. have noted that security and foreign policies more generally, have long been perceived has been exempt from standards of democratic participation or control.[131] But this does not imply that it *should* be that way.[132] Certain nuclear issues can indeed sit unwell with democratic procedures. As soon as 1950, Robert Dahl saw that "in a world environment transformed by new techniques of violence" parliamentary institutions might not be "viable" in the face of the speed and flexibility required for "survival in an atomic epoch".[133] Yet, the peculiar urgency of nuclear issues should warrant a *higher level of control* from the public considering that there exist little issues with as

[130] Dahl, *Dilemmas of Pluralist Democracy*, 12.
[131] Dirk Peters, Wolfgang Wagner, and Nicole Deitelhoff, "Parliaments and European Security Policy. Mapping the Parliamentary Field," in *The Parliamentary Control of European Security Policy* (Oslo: ARENA - Center for European Studies, 2008), 5.
[132] Halvard Leira has recently argued, convincingly, that this separation between foreign and domestic policy did not emerge out of particular substantial differences between the two fields, but rather out of specific historical processes. Notably, Leira argues, it emerged at the same time as the emergence of a bourgeois public sphere led to domestic questioning about the states' external affairs. Halvard Leira, "The Emergence of Foreign Policy," *International Studies Quarterly* 63 (2019): 187–98.
[133] Dahl, *Congress and Foreign Policy*, 249–50.

many consequences on the public. As Elaine Scarry puts it, nuclear weapons are "out-of-ratio weapons", which allow a small number of actors to cause damage to a massive number of people, and as such justify a strict control of this small number of people.[134] One could oppose to that the guardianship theory, which argues that nuclear issues are better left to the discretion of experts because of their complexity and implications. But, as Dahl argued, nuclear issues do not involve solely judgments of fact, but "complex judgments of value and fact (…) which ought therefore to be made, in a democratic society, by politicians" as the "superior competence of experts diminish to a vanishing point" when judgment of values are on the table.[135] Nuclear policymaking should therefore be the object of public control, not only because it is of supreme importance for the public, but also because it is fundamentally a political issue and should therefore be controlled by the polity.

Nuclear policymaking, among all domains of state actions, logically calls for a strong level of control if the public's interest is to be guaranteed by officials acting in the state's name. Without control over nuclear weapons, citizens are deprived of control over the conditions of their survival and the conditions under which their state will engage in large-scale destruction. Nuclear armed states can therefore only be democratic *to a certain extent*. And, considering that this extent does not include the ability to decide over existential issues, there is ground for concerns.

4. **Conclusion**

In this chapter, I have argued that the existing literature in HSS, nuclear security studies and political theory does not provide a satisfying answer to the question of how nuclear weapon pursuit affected the democratic state. Though it gives us hints at the nature of the relationship between the two, highlighting the negative impact of nuclear weapons on democracy, it does not answer why, or how, this relationship was established.

To make up for these gaps in the study of the relationship between nuclear weapons and democracies, I proposed a new framework based on the idea that technologies can have an agentic capacity, and

[134] Elaine Scarry, "The Floor of the World," *Bulletin of the Atomic Scientists* 70, no. 2 (March 2014): 22.
[135] Dahl, *Congress and Foreign Policy*, 245; Robert A. Dahl, *Controlling Nuclear Weapons: Democracy versus Guardianship*, (Syracuse, N.Y: Syracuse University Press, 1985), 47.

therefore participate in the constitution of the environment in which actors evolve. Specifically, I argued that the intrinsic properties of nuclear weapons – an exceptional destructivity – create structural constraints for state actors, and lead to structural change. These changes are not entirely determined by nuclear weapons. They depend, primarily, on existing forms of restraints against nuclear weapons. Had there existed an international control regime after 1945, the constraints created by the invention of nuclear weapons would have led to different outcomes. But, absent such restraints, states interested in acquiring nuclear weapons had to rely on information control regimes to address the security implications of nuclear research.

The structural constraints created by technology form the primary causes of nuclear secrecy regimes' formation. These products of nuclearization, in return, affect the possibilities for democratic control. The three modes of democratic control selected, deliberation, oversight and accountability, are all likely to be affected by secrecy, as an absence of information can result in the inability to participate, or to contest, the making of state action. This implies that nuclear weapons lead to the rise of restricted democracies, in which citizens are deprived of the ability to exert control over their state's ability to exert apocalyptic violence. The pursuit of nuclear weapons leads to restricted democracies.

In the following chapters, I will provide empirical evidence to support my claims. In the next chapter, I focus on the first part of the causal chain: the invention of nuclear weapons, the failure of international control plans, and the origins of nuclear secrecy.

Chapter 2. Birth of a secrecy imperative.

The invention of nuclear weapons and the end of "peacetime" (1939-1946)

Why is a nuclear weapons laboratory a place "where secrecy is viewed as *obviously* necessary"?[190] How is it that all states who engaged in a nuclear program have decided to shroud their research in utmost secrecy, without any exception?

This chapter investigates how secrecy surrounding certain aspects of nuclear weapons research emerged as an imperative for security in the post-war period, and how nuclear knowledges became objects of state secrecy *even as wartime came to an end*. It argues that it did so as the result of a combination of the intrinsic properties of nuclear weapons – including exceptional destructivity – and their specific historical context. Simply put, there is nothing in nuclear technologies that necessarily causes secrecy. However, the invention of nuclear weapons in a context of anarchic security competition between great powers created a vulnerability to the implications of the new technology, which created a structural constraint for actors. This constraint could have led to different behavior. However, absent an international control regime, which would have offered a solution for security against nuclear weapons, states had to rely on self-help, and shrouding nuclear knowledges in secrecy appeared as a relatively viable solution to prevent their spread to future adversaries. It is not just technology, but technology in a given historical context, which caused specific political outcomes because the meaning of technology is co-constituted with the context in which it emerged.

Investigating the origins of nuclear secrecy is necessary for two reasons. First, it is important because it sets the historical background in which the studied states – the UK, Sweden, and France – have evolved. It is not simply a matter of setting a context to ease the reader's task. Rather, the role of this chapter is to establish the "causal field" in which the observed phenomenon took place. Gary Goertz defines the notion of causal field as "the set of circumstances and background conditions that are important or

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[190] Michael Aaron Dennis, "Secrecy and Science Revisited: From Politics to Historical Practice and Back," in *Secrecy and Knowledge Production. Cornell Peace Studies Program, Occasional Paper #23*, ed. Judith Reppy (Ithaca: Cornell University, 1999), 1.(emphasis added)

necessary in explaining a phenomenon".[191] To explain why those three states chose to make nuclear knowledges into objects of secrecy, it is necessary to understand why, in this specific historical context, secrecy came to be considered as "obviously necessary". It is important, second, to study this context to avoid the traps of technological determinism, which would equate the necessity of secrecy with the intrinsic properties of nuclear weapons. But as noted by Wiebe Bijker, "one should never take the meaning of a technical artifact or technological system as residing in the technology itself".[192] Rather, it is necessary to determine how this meaning was constituted in, and by, a specific context instead of assuming a historical necessity. Therefore, I look at the evolution of actors' position vis-à-vis secrecy and nuclear knowledges and show how technology and context constituted each other. The co-constitution of nuclear weapons and their context means that neither the social and political meanings acquired by technologies related to the production of nuclear weapons, nor the social context in which they emerged, cannot be studied separately. Each participated in the constitution of the other.[193] But why would nuclear weapons affect their environment in the first place?

Here, my argument follows Daniel Deudney's historical security materialism, which argues that existing material forces, and most specifically forces of destruction, determine the kind of viable security structures which can emerge in a certain context.[194] With the invention of nuclear weapons, the level of violence interdependence – the capacity of actors to do violent harm to one another[195] – changed suddenly and radically. This called for a change in existing security structures to create restraints against such violence. Confronted with the world-destroying possibilities contained in nuclear weapons, actors saw two possibilities for security: international control over atomic energy, which would have required a remaking of the world, or national control over the means necessary for nuclear weapons production

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[191] Gary Goertz, *Contexts of International Politics*, (New York, N.Y: Cambridge University Press, 1994), 16.See also Mackie, *The Cement of the Universe*, chap. 2.
[192] Wiebe E. Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*, (Cambridge: MIT Press, 1995), 6.
[193] In STS, the co-productive approach to technology and social order has been outlined first in Sheila Jasanoff, ed., *States of Knowledge: The Co-Production of Science and Social Order*, (London ; New York: Routledge, 2004).
[194] Daniel Deudney, "Geopolitics as Theory: Historical Security Materialism," *European Journal of International Relations* 6, no. 1 (March 2000): 77–107.
[195] Deudney, *Bounding Power*, 35.

to prevent, or stall, the spread of those forces of destruction to other nations – the United States being, at the end of the war, the only country in possession of the technology. Once plans for international control plans, as did plans for a monopoly over fissile material, control over the knowledges necessary to build the bomb was the last solution left for security. Thus, emerged a "secrecy imperative" over nuclear knowledges as a result of the lack of other restraints against nuclear violence. With the end of the war, also came the end of "peacetime" as we know it, as nuclear weapons shattered the boundaries between war and peace by making large-scale violence possible at any time. This is consistent with my argument that nuclear weapons have an agentic capacity, as they affect actors' choices, but do not determine them.

The origins of nuclear secrecy in the early nuclear age have been traced before, but never with a focus on the causal role of technologies. Rather, Alex Wellerstein, in his history of US nuclear secrecy, focuses on the role of domestic power struggles.[196] Grégoire Mallard, in a similar vein, discussed the role of secrecy and transparency as a "technique of social control" in 1944-1946 debates over atomic energy.[197] Similarly, Gregg Herken has explained the US choice of secrecy by US policymakers' desires to exploit the advantages offered by nuclear weapons for foreign policy gains.[198] While none of these interpretations is incorrect *per se*, they do not probe the role of technology itself, the effect of the Bomb's intrinsic characteristics on the actors' choice. Consequently, this chapter aims at answering the question: why did the invention of nuclear weapons led actors to create specific secrecy regimes to control nuclear knowledges, entrenching wartime practices in peacetime?

The chapter is primarily based on secondary sources, though it also uses primary sources from British archives, and proposes a re-reading of the well-studied history of nuclear weapons' invention through the lens of secrecy. It is organized into three chronological sections. In the first, I explain why the discovery of nuclear fission did *not* lead to the emergence of a "secrecy imperative" in the 1939-1940

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[196] Wellerstein, *Restricted Data*, chap. 4.
[197] Grégoire Mallard, *Fallout: Nuclear Diplomacy in an Age of Global Fracture* (Chicago: University of Chicago Press, 2014), 42.
[198] Gregg Herken, *The Winning Weapon: The Atomic Bomb in the Cold War, 1945-1950* (New York: Vintage Books, 1982), chap. 5.

period. Despite Léo Szilard's plans for a worldwide self-censorship scheme over publications related to nuclear fission, the belief that nuclear weapons could be possible only in a very distant future due to material limitations led scientists to publish their results anyway. Contra a nationalist claim that France (meaning, Frédéric Joliot-Curie) somehow invented nuclear non-proliferation by choosing to keep certain patents secrets,[199] I argue that France's decision to shroud early nuclear research in secrecy was not linked to a realization of the actual potential of nuclear technologies but rather to the circumstances of wartime. The contribution of this chapter, therefore, is also to show that the need for secrecy over nuclear knowledges was not always there: it appeared only when actors reached a very high level of certainty over the possibility of constructing atomic bombs. This happened only with the Maud Report in 1941.

In a second section, I show that it is also relatively easy to explain why the United States, jointly with the United Kingdom, chose to shroud nuclear research in secrecy during the war as most of the explanatory work is done by the context of wartime. In wartime most research on military technology was done in great secrecy to prevent espionage. Most, but not all. One must here account for the fact that the Manhattan Project was shrouded in a special kind of secrecy, which stemmed from the actors' recognition that nuclear research, if successful, was not comparable to other forms of military research. It had a world-changing capability. In fact, a clear change in actors' relation to nuclear research can be traced to the moment when nuclear weapons ceased to be considered a distant possibility and became a very close one. With this realization, came the conclusion that the enemy could reach the same conclusion based on natural scientific knowledges. Before that, nuclear research, although secret, was not the object of particular attention. It certainly was less secret than other domains of military research, such as radar technology. The linkage between nuclear science and the possibility of nuclear weapons led actors to shroud wartime nuclear research in the highest secrecy.

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[199] Dominique Mongin, "France's Relationship to the NATO Defense Strategy and the Western Non-Proliferation Regime," in *Joining the Non-Proliferation Treaty : Deterrence, Non-Proliferation and the American Alliance*, ed. John Baylis and Yoko Iwama (London: Routledge, 2019), 73.

But then, why did British and American actors, after the war, choose to perpetuate these wartime logics in peacetime? In a third section, I discuss the implications of the failure of international control plans for nuclear secrecy. Even before the end of the war, some had argued that security from nuclear weapons would require a "remaking of the world". What was lacking, however, was the political will to enact such a project. In its absence, US officials saw few solutions but to shroud nuclear research in secrecy to prevent the spread of nuclear weapons throughout an anarchic world. It was a lost cause – and they knew it – but it at least offered the possibility of stalling competitors, keeping a technological edge, and concealing their vulnerability. The 1946 McMahon Act became the moment when nuclear secrecy finally became definitively entrenched. Two elements are hence necessary to explain why nuclear knowledges became so intrinsically linked to state security and secrecy: the discovery of the possibility, and the subsequent invention, of nuclear weapons – technology – and the absence of political arrangements which could offer security from these weapons – context. Things could have gone in another direction: another future was difficult, but not *impossible*. If the entrenchment of nuclear secrecy after the war was overdetermined, it was largely so because of political factors, not material ones. Once the McMahon Act was signed, however, the United States locked the nuclear vault.[200]

1. **Secondary neutrons: the discovery of chain reaction and the question of secrecy (1939-1940)**

The purpose of this section is to explain why something did not happen, why Léo Szilard's plan for scientific censorship over nuclear-related research failed, and why nuclear secrecy did *not* emerge as a result of the discovery of chain reaction in the months leading up to the Second World War. The origins of nuclear secrecy, its foremost historian Alex Wellerstein writes, "lay in *fear*: the idea that a dreaded enemy could have a new, enormous source of power at their disposal and that all other nations would be potential victims".[201] This fear started not with the invention of nuclear weapons, but with the discovery of the possibility of chain reaction. It was, at first, a problem for a handful of scientists, borne

[200] Sweden is kept out of that chapter as, during the Second World War, it showed very little interest for nuclear research and played no important role in the debates. On Swedish position in 1945, I refer to the chapter 3.
[201] Wellerstein, *Restricted Data*, 15.

out of the fast-paced development of nuclear science in the 30s.[202] These developments started with the discovery of the neutron in 1932, then of the mysterious transuranic elements, and culminated in 1938, with the discovery of nuclear fission – that is, of the possibility of breaking up the nucleus of an atom by shooting neutrons at it. This heralded a potential revolution, as the use of the energy released by fission for explosive purposes entered the realm of the imaginable.

But no evidence existed that this could be a possibility any time soon. Many challenges remained to be solved and, in fact, some leading physicists genuinely believed it to be impossible. The phantom of the bomb made its first appearance but, too distant from the realm of reality, it could not have causal effects. As a result, plans for censorship and secrecy proposed by Léo Szilard failed utterly and rapidly when French physicist Frédéric Joliot-Curie decided to publish the results of his team's research on secondary neutrons. In this section, essentially, I argue that nuclear secrecy does not predate the invention of nuclear weapons and that the wartime contexts serve as a better explanation for states' decision to shroud research, to a certain extent, in secrecy. This finding is important for my argument because it allows us to date more precisely the moment when the agentic capacity of nuclear weapons started to exert effects on its environment.

a. Léo Szilard's radical plan for scientific secrecy

The history of nuclear secrecy always starts with Léo Szilard, a Hungarian-born physicist. Szilard had considered the possibility of making an explosive by using the fissile properties of a certain material, although essentially at an intuitive level, very early on. In 1934, he hypothesized that using a calibrated chain of neutrons, one could fission atoms and produce a nuclear reaction that, if done on a "critical mass", could produce a chain reaction and create an almost unlimited source of energy – or a bomb. Why? Because of the famous $E = mc^2$ equation, which meant that tiny atoms could store a large amount of energy, as a given body possess an energy (*E*) equal to the speed of light (*c*) squared multiplied by its mass (*m*). Szilard took the care of filing a patent for his idea, sent it to the British Admiralty, and "urged

[202] On how the "springtime of atomic physics" – and chemistry – gave birth to the nuclear age in the 30s, see William Walker, *A Perpetual Menace: Nuclear Weapons and International Order* (London ; New York: Routledge, 2012), 28–35.

that it be kept secret". This, Wellerstein argues, "was arguably the very first instance of nuclear secrecy even before fission was discovered, and atomic bombs were technically possible."[203] At the time, the British admiralty seemed to have given little attention to the patent and moved keep it secret without much second thought. For Szilard's ideas to gain reality, many things had yet to be discovered, notably evidence that fission was something other than a theory.

Everything changed in 1939, with the discovery of that very possibility by Lise Meitner and Otto Fritsch and Fritz Strassman published in *Naturewissenchaft* in December 1938, and a few weeks later in *Nature*.[204] Some days earlier, Szilard had written to the British Admiralty to ask them to withdraw his secret patent on an atomic bomb altogether as it seemed no longer promising. When he heard the news, he promptly asked to "kindly disregard" his letter and keep his idea a military secret.[205] For him, proof of the possibility of fission was proof of the possibility of chain reaction, and therefore an explosive device was possible. Worse, he believed Nazi Germany to have the industrial infrastructure to do it and was an important hub for physics and science in general.[206] Seeing the destructive prospect of such discovery, Szilard decided that secrecy was the right choice. But he was alone in that choice. As noted by Wellerstein, that atoms could be broken up "physically interesting, and scientifically surprising, but not necessarily *scary*". After all, the energy released in such a process was "from a human point of view (…) very small".[207] Scary outcomes depended on the existence of something called secondary neutrons.

Secondary neutrons refer to neutrons released during the process of fission. When an atom breaks up, it releases energy, but some hypothesized that it could also release extra neutrons, other than the one used to break the atom. If the number of these secondary neutrons is consistently greater than 1, then, it is

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[203] Wellerstein, *Restricted Data*, 17–18.
[204] Walker, *A Perpetual Menace*, 30–31. Jewish, and exiled in Sweden, Lise Meitner was not cited as a co-author of the original publication, but subsequent research demonstrated her eminent role in the discovery. See Patricia Rife, *Lise Meitner and the Dawn of the Nuclear Age* (Boston: Birkhäuser, 1999), chap. 9.
[205] William Lanouette, *Genius in the Shadows: A Biography of Leo Szilard, the Man behind the Bomb* (New York: Scribner's Sons, 1992), 180.
[206] However, as Geoffrey Lucas Herrera has shown, the German field of physical science was structurally unfit for this kind of innovation, relying too much on the "individual power of the senior faculty member" and imposing a too large teaching charge on its scientists, impeding the emergence and development of innovative ideas. Geoffrey Lucas Herrera, *Technology and International Transformation: The Railroad, the Atom Bomb, and the Politics of Technological Change*, (Albany: State University of New York Press, 2006), 134–36.
[207] Wellerstein, *Restricted Data*, 17. (emphasis in the original)

possible to use secondary neutrons to break up other atoms, which would produce secondary neutrons in return, hence producing a chain reaction. In such a scenario, the energy released by each atom's fission would add up and become considerable. If such a process happens fast, and uncontrollably, the release of energy could be extremely destructive, on the condition that it happens in a critical mass of fissile material – otherwise, the chain reaction cannot sustain itself. It is the basic principle of a nuclear explosion.

When he heard the news of the fission discovery, Szilard was working at Columbia University with Italian physicist Enrico Fermi, and a team of mostly European researchers. Fermi swiftly crafted an experiment to investigate the existence of secondary neutrons. It worked and showed that *some* (meaning, more than one) neutrons were emitted in fission. To Szilard, this was a confirmation of his anguish. Before the experiment took place, Szilard suggested keeping the results confidential, an idea received with skepticism by his colleagues. After it succeeded, Fermi still believed that the results should be published, but his colleagues had changed their minds. In the meantime, Hitler had invaded Czechoslovakia. Fermi chose to "abide by the wish of the majority" and refrained from publication.[208] This was the beginning of Szilard's ambitious scheme to maintain secrecy over the most recent discoveries in the field of nuclear physics.

Columbia physicists agreed together that any paper on fission should not be published, but sent to the Physical Review, which would certify reception and authorship, but wait for a later day to publish.[209] Fermi then extended this scheme to other journals, contacting colleagues in Europe and all over the United States to inform them.[210] Szilard's plan was radical. It required keeping secret not an invention but the basic principle that made it possible. He aimed to prevent the world from knowing about a natural fact that could be discovered anywhere, by anyone. For it to work, it would also have required preventing every scientist, everywhere, to publish about nuclear fission or discuss it with every political or military officer from every country. The community of nuclear scientists would have become a secret society,

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[208] Spencer R. Weart, "Scientists with a Secret," *Physics Today* 29, no. 2 (February 1976): 25.
[209] Wellerstein, *Restricted Data*, 23.
[210] Wellerstein, 24–25; Weart, "Scientists with a Secret," 26.

all sharing one secret that could not be shared with outsiders. Not only was this extremely ambitious, but it also ran contrary to the scientific ethos of openness over results and methods.[211] Szilard's plan quickly failed. Spencer Weart concludes this was because of "a failure [from scientists] to understand how serious the problem was and how much secrecy might accomplish" and a failure of communication, as "nobody quite understood what was happening or how good the chances of getting agreement were"[212]. More prosaically, it failed because of one man, Frédéric Joliot-Curie, who chose to publish the results of his team's research on fission and secondary neutrons.

b. Scientific chiaroscuro at the dawn of war: Frédéric Joliot-Curie and the ambiguities of nuclear secrecy

In March and April 1939, Joliot-Curie and his team composed of Hans Halban and Lew Kowarski at the *Collège de France* thwarted, twice, Szilard's plan for a secrecy scheme. In March, his team published a first article in *Nature* which demonstrated that neutrons were emitted in fission[213] – what Fermi's team had demonstrated, but not decided not to publish. In April, they came to *Nature* with a second, even more important, discovery: uranium fission produced 3,5 – with a margin of error of 0,7 – secondary neutrons.[214] Enough, in other words, to imagine a chain reaction. Why did Joliot publish his results? That is to say, why, unlike Szilard, did he not choose secrecy? There are several reasons.

First, Joliot's team was not entirely familiar with Szilard's scheme. The first paper was published when the French team had been in contact with Szilard, but only distantly, and without a clear idea of his goal. Having obtained their results, without hearing anything new from Szilard, as Kowarski later stated, the team "considered that probably the whole idea was abandoned. We simply published."[215] Joliot had no idea how far ahead he was. Convinced that scientists everywhere were working on the issue, he did not know that only his team and Fermi's were at this stage.[216] The first publication, in any case, omitted a

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[211] As identified by Robert K. Merton, *The Sociology of Science: Theoretical and Empirical Investigations* (Chicago: University of Chicago Press, 1974), 267–78.
[212] Spencer R. Weart, *Scientists in Power* (Cambridge, Mass: Harvard University Press, 1979), 91.
[213] Hans von Halban, Frédéric Joliot, and Lew Kowarski, "Liberation of Neutrons in the Nuclear Explosion of Uranium," *Nature* 143, no. 3620 (March 18, 1939): 470–71.
[214] Hans von Halban, Frédéric Joliot, and Lew Kowarski, "Number of Neutrons Liberated in the Nuclear Fission of Uranium," *Nature* 140, no. 3625 (April 22, 1939): 680.
[215] Weart, "Scientists with a Secret," 24.
[216] Weart, 25.

piece of key information: the number of secondary neutrons. It only hypothesized, in its conclusion, the possibility of a chain reaction if that number was greater than 1. Szilard may still have believed it possible to prevent the publication of further results. When their calculation was ready for the second publication, the French scientists were fully aware of Szilard's plan. The latter reached out to them on the 5th of April, asking them to keep their results secret. Joliot considered the matter briefly and answered him: "Question studied. My opinion is to publish now."[217] Szilard was convinced that Joliot would eventually "come around" because his strategy would put him at a disadvantage: "We could know *his* results and yet, he would *not* know ours".[218] Suffice to say, it was a misestimation of Joliot's personality.

Second, Joliot thought the security implications of the discovery were limited. Joliot's choice to publish was not motivated simply by an ideal of scientific openness. Although a proponent of scientific internationalism, Joliot did not outright reject the idea of secrecy in science. In 1936, he had declared that his opinion was that "if society continues to live according to current rules, I sincerely believe that it would be preferable that men of science do not divulge their discoveries. They will announce it when the world will be a better place".[219] But he also understood that Szilard's scheme was flawed, lacking the means to realize its ambitions.[220] Moreover, Joliot and his team viewed the threat of a nuclear bomb differently. They thought it to be ages away because they knew what a critical mass, the concept imagined by Szilard, of natural uranium represented. Francis Perrin, who had joined the team in March, had calculated it to be around 40 tons or 12 tons if enveloped in a coating that could reflect neutrons.[221] Consequently, not only would this bomb be enormous, but it would not be very efficient compared to the use of a similar weight of conventional explosives, and barely usable as a weapon. Moreover, the initiation of the chain reaction was likely to heat the material, disperse it, and make it fall below its critical mass.[222] Nuclear weapons therefore seemed an issue for the distant future. For this reason,

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[217] Weart, 28.
[218] Rife, *Lise Meitner and the Dawn of the Nuclear Age*, 223–24.
[219] Cited in Michel Pinault, "Frédéric Joliot et La Réaction Nucléaire En Chaîne, de La Compétition Au Secret : Les Modifications de La Communauté Scientifique Qui En Découlent (1939-1940)," in *De La Diffusion Des Sciences à l'espionnage Industriel, XVe-XXe Siècle : Actes Du Colloque de Lyon, 30-31 Mai 1996*, ed. André Guillerme (Lyon: SFHST, 1996), 266.
[220] Michel Pinault, *Frédéric Joliot-Curie* (Paris: Odile Jacob, 2000), 190.
[221] André Bendjebbar, *Histoire Secrète de La Bombe Atomique Française*, (Paris: Cherche Midi, 2000), 25.
[222] Weart, *Scientists in Power*, 94.

Francis Perrin considered that it was safe to publish the results, and Joliot agreed.[223] It must be noted that this decision had the immediate consequence of raising the Nazis' interest in the nuclear question.[224]

But more than this, and consistent with the idea that Joliot was not a radical opponent of secrecy, the team did not consider the choice to publish to be antithetic with secrecy. Simply, Joliot diverged from Szilard on the question of "secrecy over what?". Instead of maintaining secrecy on basic knowledge, Joliot believed in secrecy over applied knowledge. In May 1939, the team filed three patents for technical devices using chain reactions. Two were related to industrial uses and energy production, and one to its military uses. This patent proposed to use a "substance (uranium, thorium or other) susceptible to create, under the action of neutrons, a chain emission of neutrons" to release an important amount of energy, "preferably very rapidly at the end".[225] It was a very basic sketch of a nuclear weapon. Contacted by the director of the Center for National Scientific Research (CNRS), prime minister Edouard Daladier decided that the 3rd patent, "in any event, should remain secret".[226] It seems to have been a request from Joliot's team.[227] This choice was unsurprising, reflecting the recent evolution in the French secrecy regime. The French state was preparing for war and feared German espionage. In 1938, a new law had been implemented which created a stronger penalty for espionage – now punishable by death or forced labor – and forbidding unauthorized divulgence of "inventions of interest for national Defense" or "documents, studies, or methods of fabrication related to an invention of that kind".[228] As an invention of interest for national security, in a time of heightened international tension, the patent automatically became property of the French state.

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223 Bendjebbar, *Histoire Secrète de La Bombe Atomique Française*, 25.
224 On April 29, a secret conference took place in Berlin which led to "a research program, a ban on uranium exports, and provision for supplies of radium" from Czechoslovakia. Richard Rhodes, *The Making of the Atomic Bomb* (New York: Simon & Schuster, 1986), 296.
225 « *Perfectionnement aux charges explosives*, brevet demandé par la Caisse Nationale de la Recherche Scientifique », 4th May 1939, reproduced in Margaret Gowing and Bertrand Goldschmidt, *Dossier Secret Des Relations Atomiques Entre Alliés (1939-1945)* (Paris: Plon, 1965), 227.
226 Bendjebbar, *Histoire Secrète de La Bombe Atomique Française*, 26.
227 Pinault, *Frédéric Joliot-Curie*, 192.
228 Article 4, Décret relatif à la répression de l'espionnage, *Journal Officiel*, 29th June 1938, 7473. On this law, see Olivier Forcade, *La République Secrète. Histoire Des Services Spéciaux Français de 1918 à 1939* (Paris: Nouveau monde, 2008), 91–95.

Joliot's team kept working between publicity and secrecy. They continued to publish the results of their research but kept secret their negotiations with a Belgian firm to secure the supply of several tons of uranium oxide. They also started to consider the idea of conducting a "secret experiment in the Sahara", to assess the possibility of using chain reaction as an explosive device.[229] When the war began, things changed. The work on the possibility of nuclear explosives was quickly dropped and research refocused on energy production.[230] The *Collège de France* scientists were told that "everything they learn[ed] in the performance of their duties constitutes a secret", while guards were posted around the laboratories and while their windows were painted.[231] They restricted their cooperation with other scientists, even those with whom they were once close.[232] Now, the results of their research were kept secret, although some were published. On the 19th of September, Joliot's colleagues published a common article for the last time. They took care to underline in the first footnote that "the results given here correspond to experiments realized before the 1st of September 1939", before their research fell under wartime secrecy.[233] In May-June 1940, all research efforts crumbled into dust as the German army advanced. Joliot and his team did their best to keep their research secret from the occupiers. Most of the scientists involved in these research – except Joliot – fled France. They would take part in nuclear research in the UK, Canada, or the United States.

The most important results, however, had been deposited in the meantime to the *Académie des Sciences*, where they were stored in a sealed envelope.[234] The use of sealed envelopes at the *Académie* was a mechanism created in 1666 by Colbert, who sought a way to protect French inventors from counterfeits. These "*plis*" never had a clear legal status but serve essentially to prevent the divulgence or imitation of discoveries. They can only be opened by the wish of the person who submitted it, or after a vote by the

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229 Jonathan E. Helmreich, *Gathering Rare Ores: The Diplomacy of Uranium Acquisition, 1943-1954* (Princeton, N.J: Princeton University Press, 1986), 4.
230 Bertrand Goldschmidt, *Pionniers de l'atome* (Paris: Stock, 1987), 68.
231 Weart, *Scientists in Power*, 119.
232 Goldschmidt, *Pionniers de l'atome*, 66.
233 Hans Halban et al., "Mise En Évidence d'une Réaction Nucléaire En Chaîne Au Sein d'une Masse Uranifère," *Journal de Physique et Le Radium* 10, no. 10 (September 19, 1939): 428–29; Pinault, *Frédéric Joliot-Curie*, 210.
234 Pinault, *Frédéric Joliot-Curie*, 211.

Académie.[235] The opening of the envelope, revealing the patent, serves as proof of authorship. This was a very elegant solution, but not an original one. It was, in fact, quite common for wartime. All in all, there were 95 envelopes deposited every year on average, many during the war.[236] The sealed envelope had been used during the First World War to ensure authorship over classified inventions related to national defense and in the first months of the Second World War, several sealed envelopes were deposited. The purpose was to ensure that the inventors would not lose the benefits of the industrial use of their invention after the war. This system indicates that "nuclear secrets" were perceived in regard to their potential industrial postwar interest, more than for their immediate military value. Surprisingly enough, French secrecy held firm despite the utter dismemberment of the French state. It seems that the Nazis never heard about the secret patents kept at the *Académie*.

CEA historian Dominique Mongin wrote that the decision to keep the patent secret was "the beginning of a secrecy policy intended to avoid nuclear proliferation", making France somewhat the inventor of nuclear non-proliferation.[237] This is, of course, a major anachronism. It relies on a teleological reading of nuclear history where Joliot's discoveries equate to the discovery of the atomic bomb, even though this possibility remained utterly uncertain until a better fissile material was found. It also assumes that actors from the 30s relied on a specific theory about how nuclear weapons spread which only emerged in the 60s.[238] It assumes, finally, that the patent's classification was somehow out of the ordinary and served a specific policy goal. To the contrary, it was the application of a normal legal mechanism to a recent invention that was relevant to national Defense at a time of heightened tension in Europe, and of renewed efforts by the French state to build effective secrecy regulations to counter espionage.[239] Secret

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[235] E. Stewart Saunders, "The Archives of the Academie Des Sciences," *French Historical Studies* 10, no. 4 (1978): 700.

[236] Pierre Berthon, "Les Plis Cachetés de l'Académie Des Sciences," *Revue d'histoire Des Sciences* 39, no. 1 (1986): 71–79.Voir aussi Edgardo D. Carosella, ed., *Sous Le Sceau Du Secret. Les Plis Cachetés de l'Académie Des Sciences* (Paris: CNRS éditions, 2020).

[237] Mongin, "France's Relationship to the NATO Defense Strategy and the Western Non-Proliferation Regime," 73.

[238] Benoit Pelopidas, "The Oracles of Proliferation: How Experts Maintain a Biased Historical Reading That Limits Policy Innovation," *The Nonproliferation Review* 18, no. 1 (March 2011): 297–314; Matthew Woods, "Inventing Proliferation: The Creation and Preservation of the Inevitable Spread of Nuclear Weapons," *The Review of International Affairs* 3, no. 3 (March 2004): 416–42.

[239] In 1939, the French parliament passed a second law reinforcing secrecy regulations and creating a new category of secrecy, the "Secret de défense", which made every information of military interest secret, regardless

patents and sealed envelopes were standard ways of dealing with military scientific invention, particularly in wartime. French officials opted for nuclear secrecy not because it perceived the discovery as particularly revolutionary, but because it harbored normal concerns about military innovation. Joliot's research was of interest to the war effort; hence its results were secret. Joliot's secret patents are, instead, evidence of the indistinction between nuclear-specific knowledges, and military knowledges in general.

This section has argued against an over-deterministic approach to nuclear secrecy, which would seek its origins in Szilard's scheme or Joliot's patent. I have shown how Szilard's approach, although visionary, failed precisely because it was too visionary. Nuclear weapons had no reality – and hence, no agentic capacity. Placing the starting point of nuclear secrecy with Szilard would be somehow anachronistic. Although there is a clear continuity, it can only be established in retrospect. When Szilard established his scheme, a nuclear weapon was not realistically conceivable yet – as evidenced by Perrin's calculation – and there existed no certainty that they will be discovered. Starting the history of nuclear secrecy with Szilard makes sense only because we know that nuclear weapons have been invented. But in 1939, no one knew.[240] Similarly, seeing Joliot as the father of non-proliferation is as wrong. Joliot's research was classified because, in one way or another, they were interested in national defense in the broadest sense, not because there was a sense of an imperative of some sort. Just like Szilard, he did not know how to produce usable fissile material. Only when this problem was solved, and when nuclear weapons were "invented" in a more proper sense, could technology start to affect its environment.

2. **Atomic bombs: the invention of nuclear weapons and the transformation of secrecy (1941-1945)**

When the war started, nuclear knowledges had no exceptional status. As research of military interest, they were treated with care, but without the sense of dread which would surround them only a few years later. In 1939-1940, the discovery of secondary neurons had made a nuclear chain reaction theoretically

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of its actual classification. Bertrand Warusfel, *Contre-Espionnage et Protection Du Secret: Histoire, Droit et Organisation de La Sécurité Nationale En France* (Panazol: Lavauzelle, 2000), 152–55.

[240] On the problems with the recurring "romantic trope" of Szilard seeing the tragic future of the humanity before everyone else, see Hugh Gusterson, "Secrecy, Authorship and Nuclear Weapons Scientists," in *Secrecy and Knowledge Production. Cornell Peace Studies Program, Occasional Paper #23*, ed. Judith Reppy (Ithaca: Cornell University, 1999), 66–68.

imaginable. However, without of a proper fissile material, the problem posed by nuclear weapons, remained decades away. This changed radically in 1941 following the "MAUD report", a secret British report which demonstrated the rapid feasibility of nuclear weapons. Nuclear weapons suddenly became real. At this moment, nuclear physics fully entered the realm of secrecy. The reality of the technology constrained state actors to make choices. By 1944, nuclear technologies had led to the development of an unprecedented secrecy regime in both wartime states.

In this section, I move my focus from France to the UK, as the former experiences defeat, and then to the US. I argue that the MAUD report should be understood as the starting point of the history of nuclear secrecy. With it, actors suddenly realized that the prospect of nuclear weapons was not simply a matter of distant future, but of immediate urgency. With this certainty, the security implications of nuclear knowledges imposed themselves on actors. Considering the wartime context, secrecy over nuclear research became imperative. This was not only true of the UK. In the US too, secrecy was imposed on a hitherto open research environment the very moment when the MAUD report was received. The possibility of nuclear weapons would suddenly become the war's "best kept secret" – a classic yet poor, choice of word, as it was not so well kept. This is an important point because it means that secrecy historically emerged as a direct by-product of technological development. As soon as nuclear weapons became part of the actors imagined futures, they felt compelled to find solutions for security against them.

a. A certainty: the Peierls-Frisch memo, the MAUD report, and the British invention of nuclear secrecy

In March 1940, two exiled Jewish physicists at the University of Birmingham, Rudolf Peierls and Otto Frisch, wrote a memorandum in which they discussed the possibility of making atomic bombs using U235. As Peierls saw the war break out in Europe, he had grown curious and anxious about the possible militarization of nuclear fission. In January 1940, a discovery made by Niels Bohr and John Wheeler at Princeton provided him with some comfort: in the *Physical Review*, Bohr and Wheeler demonstrated that fission by slow neutrons could only take place with Uranium 235, an extremely rare isotope of

uranium.[241] Natural uranium is composed of a mix of two isotopes: the abundant, yet not fissile, U238, and the lighter, rarer (making up about 7% of all uranium), and highly fissile U235. Nuclear fission observed in laboratories was the result of the scientists' efforts to "coax the highly fissionable U235 out of hiding".[242] This finding was reassuring because the isolation of the fissile isotope from a mass of uranium would require enormous effort. Bohr considered it almost impossible, "unless you turn the United States into one huge factory".[243] His paper with Wheeler seemed to show that an atomic bomb was not realistic – confirming Perrin's ideas.

But, as Otto Frisch asked his colleague Peierls: "Suppose someone gave you a quantity of pure 235 isotopes of uranium – what would happen"?[244] It was a purely theoretical question, on which both men started working. Their calculation took away all the comfort Bohr's discovery could have provided them. It showed that only a small quantity of U235 – about 5kg – was enough to trigger a nuclear explosion with a yield of "about 1000 tons of dynamite" (1kt).[245] Considering that benefit, the cost of building an isotope separation plant to produce the necessary U235 seemed suddenly worthwhile. Peierls and Fritsch wrote a second memo, which dealt precisely with the issue of isotope separation and outlined a basic method for reprocessing uranium via "thermal diffusion".[246] What Bohr and others still considered out of reach appeared, for Peierls and Frisch, only a few years away. The prescience of their memo is remarkable in that regard: not only did it lay out a basic design for a nuclear weapon, but it also discussed the moral issues involved and the issue of radioactive fallout, against which, they write, "effective protection is hardly possible".[247] The Peierls-Fritsch memorandum changed the nature of the nuclear problem: it was "the first scientific paper anywhere to conclude that a nuclear bomb was not only

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[241] Rudolf E. Peierls, *Bird of Passage: Recollections of a Physicist* (Princeton: Princeton University Press, 1985), 152.
[242] Rhodes, *The Making of the Atomic Bomb*, 287–88.
[243] Cited in Rhodes, 294.
[244] Peierls, *Bird of Passage*, 154.
[245] This was, in retrospect, a major underestimation. Frisch-Peierls Memorandum, "On the Construction of a "Super-bomb" based on a Nuclear Chain Reaction in Uranium", March 1940, available online: https://www.atomicarchive.com/resources/documents/beginnings/frisch-peierls.html
[246] It aimed at separating U235 from U238 by using heated surfaces. U238 disperses toward a cold surface, while U235 diffuses toward a hot surface, enabling to separate the two. Frisch eventually abandoned this work in late 1940. Christopher Laucht, *Elemental Germans: Klaus Fuchs, Rudolf Peierls and the Making of British Nuclear Culture 1939-59* (London: Palgrave Macmillan, 2014), 43.
[247] Frisch-Peierls Memorandum, "On the Properties of a Radioactive 'Super-bomb'", March 1940, available online: https://www.atomicarchive.com/resources/documents/beginnings/frisch-peierls-2.html

possible but almost a certainty”.[248] “Almost” is important here: many of Britain’s leading physicists, such as Henry Tizard or John Cockcroft, were cautious about this finding.[249] Francis Simon wrote a memo to Churchill cautioning against lending too much credibility to claims about the dangers of U235.[250]

Fearing espionage, Peierls and Frisch had worked in secret, “did not even entrust the manuscript to a secretary” and made only one copy.[251] The memo was passed along to Henry Tizard, chief of British scientific military research, who eventually convinced Chamberlain to organize a committee of scientists to study this possibility, dubbed the MAUD committee. As “enemy aliens”, Peierls and Frisch were originally forbidden to participate in its work, a rule which eventually changed at Peierls’ demand. These measures were not specific to nuclear scientists: Peierls had originally been refused permission to work with physicist Marcus Oliphant on radar research, or even to join the Civil Defense teams, and was kicked out of his office building because secret radar research was taking place there.[252] Nuclear research, before 1941, in the UK as in the still neutral US, was largely less secret than anything related to radar research.[253] The UK, in that regard, was largely comparable to 1940 France. Chadwick even encouraged physicist Joseph Rotblat to include basic coverage of fission in his lecture at the University of Liverpool “as a sort of bluff” while the MAUD committee pursued his work in secret.[254]

In the summer of 1941, the MAUD committee came back with its report, which confirmed Peierls and Frisch’s findings and concluded on the technical feasibility of an atomic bomb. The committee, in their own words, had “entered the project with more skepticism than belief”, but their findings changed their

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[248] David Zimmerman, “The Tizard Mission and the Development of the Atomic Bomb,” *War in History* 2, no. 3 (November 1995): 264.
[249] See Zimmerman, 266–67.
[250] Nancy Thorndike Greenspan, *Atomic Spy: The Dark Lives of Klaus Fuchs* (New York: Viking, 2020), chap. 11.
[251] Laucht, *Elemental Germans*, 38; Peierls, *Bird of Passage*, 154–55.
[252] Peierls, *Bird of Passage*, 146–47.
[253] Zimmerman, “The Tizard Mission and the Development of the Atomic Bomb,” 265. This would remain partly true after the war: US policies of export control took radar technology almost as seriously as nuclear ones. Mario Daniels and John Krige, *Knowledge Regulation and National Security in Postwar America* (Chicago ; London: The University of Chicago Press, 2022), 48.
[254] Andrew Brown, *Keeper of the Nuclear Conscience: The Life and Work of Joseph Rotblat* (Oxford : New York: Oxford University Press, 2012), 31.

mind: the atomic bomb became a certainty.[255] Not only would it be terribly destructive, but there also existed no protection against its effects. James Chadwick, describing his opinion of the time in a later interview, declared that with this report, he “realized then that a nuclear bomb was not only possible – it was inevitable”.[256] That he saw this as “inevitable” is an interesting evidence of the role of imagined futures in the shaping of nuclear choices – why, indeed, would it be inevitable that a technology be invented because it is possible?[257] But, in any case, the report caused Churchill to launch a large-scale effort to implement the conclusion of the MAUD report.[258] It also radically changed the British state’s attitude toward nuclear secrecy. From then on, atomic research in the UK was entirely concealed from the public eye. Using the state’s exceptional wartime power, British officials concealed their intent and their research from the Nazi enemy. Just as Churchill decided to embark on an atomic bomb project, on the last day of August 1941, Hitler launched a massive offensive against the Soviet Union. The future looked grim, especially because the MAUD committee considered in its report that Germany was very likely working on similar lines.[259]

As soon as research started, under the innocuous auspices of the Directorate of Tube Alloys (DTA, the codename of the nuclear project), censorship took a hold of scientific journals and newspapers. British policymakers apparently considered the possibility of dividing the Tube Alloys project in two, with the military project being called T.A1 and a power production project called T.A2. TA.2 would serve as a “convenient cover (…) about which information might be allowed to leak fairly freely”. This scheme was abandoned when it became clear that the “power project might also have a military aspect” and that

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[255] Report by M.A.U.D Committee on the use of Uranium for a Bomb, July 1941, Secret, available online: https://fissilematerials.org/library/maud.pdf.
[256] Graham Farmelo, *Churchill's Bomb: How the United States Overtook Britain in the First Nuclear Arms Race* (New York: Basic Books, 2013), 179.
[257] One could argue, obviously, that such view is much too deterministic, as it supposes that if a technology is possible, it will be invented, and adopted by states regardless of other consideration. On the fallacy of technological determinism and the determinants of state weapons procurement, I refer to Sanne Cornelia J. Verschuren, “Imagining the Unimaginable: War, Weapons, and Procurement Politics” (Doctoral Dissertation, Rhode Island, Brown University, 2021), chap. 2. On the role of imagined futures, see Benoît Pelopidas, “Nuclear Weapons Scholarship as a Case of Self-Censorship in Security Studies,” *Journal of Global Security Studies* 1, no. 4 (November 2016): 330–31.
[258] Lorna Arnold and Mark Smith, *Britain, Australia and the Bomb: The Nuclear Tests and Their Aftermath* (Basingstoke: Palgrave Macmillan, 2006), 3.
[259] Report by M.A.U.D Committee, *Ibid*, 1.

what had to be concealed was the very interest in nuclear fission.[260] All of Tube Alloys would be shrouded in secrecy. The editors of five leading journals were contacted and asked to submit any article which could be related to the "tube alloy field" to the censorship office of DTA, where it would be evaluated. Editors were given a definition of the "tube alloy field" as "every contribution to knowledge, or to the application of knowledge, which is capable of being used in the dividing or operation of means for the liberation or utilization of intra-atomic energy". Newspapers, for their part, were prevented from publishing any article which could hint at any British interest in atomic research. For this reason, articles about British attempts to acquire or sabotage the heavy waters resources of Norway were censored for this reason and published only at the end of the war in Europe.[261] Szilard attempted project became a reality, this time with teeth, and backed by the state's wartime power. The project was so secret that MI5, was not told of the nature of the project despite being responsible for providing its personnel's security clearances.[262] The British leadership sought to protect its nuclear secrets dearly. In 1941, it refused a US suggestion for a joint project, offering, at best, "information exchange".[263] It is possible that the British expressed reservations about the US scientist's ability to keep secrets.[264] They were aware of the importance of the information they kept in the MAUD report and did not want to risk any leaks.[265] They were unaware, however, that just days after its conclusion, the report had been sent to the Kremlin by a British spy, informing Stalin about the possibility of atomic weapons.[266]

The fact the British leadership chose to shroud nuclear research in secrecy as soon as nuclear weapons become a "certainty", should not be understood as a claim that they, and particularly Churchill, immediately understood the meaning of the nuclear revolution. The link between the unique destructive

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[260] Minute for the Prime Minister, 2nd January 1945, Top Secret, FO 115/4650, TNA, 2-3.
[261] Letter from the Directorate of Tube Alloys to the Privy Council Office, "T.A. Censorship", 29th March 1944, Most Secret, CAB 126/302, TNA.
[262] Charmian Brinson and Richard Dove, *A Matter of Intelligence: MI5 and the Surveillance of Anti-Nazi Refugees, 1933-50* (Manchester: Manchester University Press, 2014), 195.
[263] Arnold and Smith, *Britain, Australia and the Bomb*, 3.
[264] In late 1941, in a letter to James Conant, Vannevar Bush despaired over their own ability to keep secrets, writing "It begins to look as though the British were right in regard to our inability to hold matters confidential". Wellerstein, *Restricted Data*, 40.
[265] Farmelo, *Churchill's Bomb*, 195.
[266] Luckily for the British, it had "no immediate effect" on Soviet planning. David Holloway, *Stalin and the Bomb: The Soviet Union and Atomic Energy, 1939 - 1956* (New Haven: Yale Univ. Press, 1994), 81–83.

capacity of nuclear weapons and the problem of world order would be made only later. Churchill, in fact, arguably did not grasp the real meaning of his choice until after Hiroshima.[267] The MAUD report, in itself, did not announce a historical revolution, but rather a technological leap that could "*likely* lead to decisive results in the war". Churchill's position toward this innovation was rather mild: "Although personally, I am quite content with the existing explosives, I feel we must not stand in the path of improvement".[268] What they knew was that their project was qualitatively different from any other because its "secret" could be summarized in a handful of words: it is possible to break up the nucleus of an atom to use it as a weapon. For the next four years, this would be the Allies' most guarded secret. The US, just as the UK, would see their environment transformed by the MAUD report.

b. Secrecy and the Origins of the Manhattan Project

On the other side of the Atlantic the MAUD report had an immediate impact too. At this point, the United States were still neutral in the war although, since the fall of France, policy planners had started to rethink their relation to Europe and adopted a critical stance toward "isolationism".[269] Research on nuclear fission was ongoing, but it was neither cohesive nor particularly secret. A Uranium Committee had been created to investigate the possibility of atomic weapons. Although its work was secret, it was "not yet a "special" kind of secrecy. Correspondence regarding the program did not use code-names and often did not contain classification markings at all."[270] As in France or Britain before the MAUD report, wartime considerations justified a certain caution, but nothing justified excessive secrecy. But, as in Britain, everything changed with the MAUD report. It was the "immediate catalyst" of the US decision to embark on a nuclear weapon program.[271]

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267 Jacques E. C. Hymans, "Britain and Hiroshima," *Journal of Strategic Studies* 32, no. 5 (October 2009): 791.See also Jonathan Rosenberg, "Before the Bomb and After: Winston Churchill and the Use of Force," in *Cold War Statesmen Confront the Bomb. Nuclear Diplomacy since 1945*, ed. John Lewis Gaddis et al. (Oxford: Oxford University Press, 1999), 171–93.
268 Farmelo, *Churchill's Bomb*, 184, 188. (emphasis added)
269 See Stephen Wertheim, *Tomorrow, the World: The Birth of US Global Supremacy* (Cambridge, MA: Harvard University Press, 2020), chap. 3, in particular.
270 Wellerstein, *Restricted Data*, 35.
271 McGeorge Bundy, *Danger and Survival: Choices about the Bomb in the First Fifty Years* (New York: Vintage Books, 1990), 48.

In the summer of 1941, the government apparently was "very close to dropping fission studies from the war program".[272] The MAUD report radically turned the tide. It was transmitted to the US leadership in October 1941, but Vannevar Bush and James Conant, the main architects of the state effort for fission research, had already heard about some of its conclusion. Early in October, Bush arranged a meeting with Roosevelt and his vice-president Henry Wallace, during which he got approval for a nuclear research program. Even before they had gotten this approval Conant and Bush accelerated research and secrecy. Conant now "emphasize[d] the highly confidential nature of their work and urged scientists to watch what they said to others, even including military personnel".[273] Secrecy, around what would soon become the Manhattan Project, reached unprecedented proportions. The realization that the atomic bomb was a real possibility changed the nature of secrecy over fission research. Preventing the Nazis, and then the Japanese – and, to a certain extent, the Congress – from ever hearing about the existence of the project became the driver of each American decision on secrecy. The solution for secrecy was similar to the British one: "not to stop research but to stop publishing that research (…); not to change the practices of science in the laboratory but instead to change the flow of knowledge".[274]

In September 1942, it was decided that the nuclear project, instead of being joint with the Office for Scientific Research and Development (OSRD) and the Army would come under the sole authority of the Manhattan Engineer District. Under the authority of Brigadier General Groves, the Manhattan Project became a highly secret and highly compartmentalized enterprise. While research was scattered around different sites over the US and Canadian territory, the heart of the work – designing the weapons – took place at Los Alamos. In other sites, such as Oak Ridge or Hanford, where the production and metallurgy of plutonium was ensured, most workers were unaware of the exact nature of their work, or about its hazards – all, however, were under surveillance.[275] It is not necessary to give a detailed history of the Manhattan Project's secrecy.[276] What matters is that by 1944, nuclear weapons programs had led

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[272] Rhodes, *The Making of the Atomic Bomb*, 368.
[273] Wellerstein, *Restricted Data*, 37.
[274] Michael D. Gordin, *Red Cloud at Dawn: Truman, Stalin, and the End of the Atomic Monopoly* (New York: Farrar, Straus and Giroux, 2009), 29–30.
[275] Kate Brown, *Plutopia: Nuclear Families, Atomic Cities, and the Great Soviet and American Plutonium Disasters* (Oxford: Oxford University Press, 2015), 68, 24–25.
[276] This has been done in an exhaustive manner by Alex Wellerstein. See Wellerstein, *Restricted Data*., part. I.

to the birth of an unprecedented secrecy regime in two wartime states. State officials in both countries made that choice when nuclear weapons became a tangibly real possibility. The discovery of the potential for nuclear weapons constrained states into taking exceptional secrecy measures. By 1944, as the possibility of a victory of Europe became more and more likely, especially after the Normandie landings, the question of nuclear secrecy in peacetime began to be weighed by US and UK leaders, officials, and scientists. Roosevelt had started to ponder the role secrecy could play in a peaceful nuclear future. His ideas were not yet very developed – his decision to cut cooperation with the UK lasted for only some months, before restarting. This process, which started in 1944 and finished only in late 1946, would seal the fate of nuclear secrecy in the post-war years.

What does the 1940-1944 period tell us? The conjunction of the discovery of nuclear weapon possibility with the choice of engaging in unprecedented efforts for secrecy arguably lends credibility to a claim about the causal role of technology in influencing the actors' behavior. Terrified at the prospect that such a weapon could arm the Nazis, British and American actors felt no other choice than to take measures to the height of the stake. Technology drove that choice. The peculiar nature of the invention – the fact that it related not to the new application of known processes, but to previously unknown natural knowledges – also explains the choice of secrecy: technically, it was imaginable to hide the very existence of the program because to imagine its existence would require to know a secret, that nuclear weapons were possible.

At the same time, the wartime context plays an important role in the explanation. Nuclear research was secret, but so was radar research, or proximity fuze research.[277] As Michael Aaron Dennis reminds us, there is some "over-reliance upon the Manhattan Project for our understanding of wartime secrecy", which blinds us to similar dynamics happening in other research programs.[278] That states sought cast a veil of secrecy over research with massive military consequences in the middle of history's largest war is easily explainable by context. Even though technology drove secrecy, it is context that determined the

[277] On secrecy over proximity fuze research, see Michael Aaron Dennis, "'Our First Line of Defense': Two University Laboratories in the Postwar American State," *Isis* 85, no. 3 (September 1994): 427–55.
[278] Dennis, "Secrecy and Science Revisited," 6.

choice in the end, as it left actors with very few available options. Secrecy was an imperative, but mainly because it was a general wartime imperative. The rejection of other options in the post-war period, with its larger universe of possibility, would entrench that choice.

3. The terror of the new world: the failure of international control and the Birth of the secrecy imperative (1944-1946)

The previous section has shown how, in 1941, the discovery that nuclear weapons could be produced on a reasonable timescale plunged nuclear research into high levels of secrecy. This was mainly motivated by wartime considerations: many suspected that the Nazis were working on the bomb, and everyone shared the conviction that Germany should under no circumstance be allowed possession of such weapons. By 1944, however, Nazi Germany did not seem like such a threat as its downfall was nearing. The US leadership started to consider the question of the post-war world order with much more intensity. Then arose the question: what of atomic weapons after the war?

Secrecy turned out to be a key part of this debate. Two sides faced each other: the proponents of international control, and the proponents of a US (and possibly UK) nuclear monopoly. These two positions encompassed two antithetical conceptions of future world order, and of the kind of restraints necessary against nuclear violence. International controllers vouched for a radically different conception of international relations based on cooperation and transparency, seen as the only guarantee of security in a world where nuclear war was a conceivable future. They sought a remaking of the world. Nuclear monopolists, on the other hand, considered secrecy an imperative for security, and hoped to achieve security with nuclear weapons. They sought, instead, a remaking of the state, as new institutions would be necessary to control the weapons and the knowledge around them.

International controllers and nuclear monopolists disagreed over the meaning of nuclear weapons, but also over the meaning of secrecy. For the former, secrecy was a source of insecurity. It would create distrust among nations and lead to a disastrous arms race. For the latter, it was a necessary source of security. The full transparency required to monitor disarmament seemed either impossible or undesirable as it implied a violation of sovereignty. Both sides agreed on one thing: after the invention of nuclear

weapons, statemen had to make a choice about how to ensure security in a nuclear-armed world. International control failed, and US statesmen chose secrecy. In this section, I show how that choice was made, and how other possible choices could have been made instead. I argue that the chosen regime endowed nuclear knowledges with security implications that would have not existed in a context where other restraints on nuclear technologies existed. In making that choice, US actors determined the meaning of nuclear weapons' technopolitics for decades to come.

a. Debating possible futures: the question of international control before and after Hiroshima

The question of the international control of nuclear weapons and of atomic energy more generally did not appear suddenly in 1944. Szilard's scheme for scientific secrecy constitutes an early take on the problem, and the idea would not disappear from the scientists' minds in later years. But because of a conjunction of factors, it became a salient issue by the year 1944. British officials only started to give serious consideration to the issue of post-war order after the Quebec Agreements.[279] By this point, the situation in Europe was very different than in 1942, and although no one could foresee the exact end of the war, nor its precise shape, at least an Allied victory seemed like a reasonable possibility. Moreover, as a nuclear weapon became more and more likely before the end of the war, it was time to think about its use and the problems it could raise.

i. Early international controllers: Bohr, Conant, and Bush

In wartime thinking about the possible future for a nuclear-armed world, Niels Bohr was a prominent figure. A major player in the field of nuclear physics,[280] Bohr spent the first years of the war in Denmark where, until early 1943, he still believed a nuclear bomb to be impossible in the short term.[281] That same year, the change in the Danish political situation forced him to flee to Sweden, where he received a telegram inviting him to join the Tube Alloy project. He flew to London, where he was briefed on the

[279] Hymans, "Britain and Hiroshima," 779.
[280] On the historical role played by Bohr in the rise of nuclear physics as both a scientist and a laboratory director in the 1930s, see Finn Aaserud, *Redirecting Science: Niels Bohr, Philanthropy, and the Rise of Nuclear Physics* (Cambridge ; New York: Cambridge University Press, 1990).
[281] Finn Aaserud, "The Scientist and the Statesmen: Niels Bohr's Political Crusade during World War II," *Historical Studies in the Physical and Biological Sciences* 30, no. 1 (January 1, 1999): 14.

status of the bomb project. The news baffled him.[282] After two months in London, he moved again to the United States to join Los Alamos. At the heart of the US bomb project, Bohr made "some technical contribution to the bomb", but that would not be his main contribution: above anything else, "he was most influential in exhorting the scientists (…) to think about the long-term implications of their work".[283]

Before Los Alamos, Bohr briefly moved to Princeton but changed his mind after a "devastating experience" meeting Albert Einstein at a public event. Having traveled to America with his family under aliases, and aware of the extreme secrecy surrounding the project, Bohr was unhappy when the author of general relativity theory greeted him loudly and announced his delight at Bohr's decision to come to the US to make right the "frightful mess of the uranium work". This was an obvious reference to the secret bomb project, a topic that was better not mentioned in public, particularly by such a famous figure.[284] It was not that Bohr was troubled by the perspective of participating in the atomic project. He, however, worried deeply about the prospects of an atomic arms race and the risks leaks posed in that regard. As Wellerstein puts it, he "worried about the Soviets. What would they think when they learned they were cut out of a secret as large as the atomic bomb?".[285] The risk was serious that they may engage in a similar program and then, the world would forever live in the fear of an atomic war. To prevent this, he suggested in a memo sent around Los Alamos, scientists and policymakers should support an international control scheme for nuclear weapons. What he called for was not simply more transparency in atomic affairs, but a "new approach to the problem of international relationship" and the establishment of an "open world" as, in a nuclear-armed world, "no real safety can be achieved without a universal agreement based on mutual confidence".[286]

Bohr was not the only one to think so. As Hymans has shown, wartime ideas about international control, which would require telling the Soviets about the bomb, were not the monopoly of "political naïfs like

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[282] Aaserud, 16.
[283] Wellerstein, *Restricted Data*, 136.
[284] Finn Aaserud, "Niels Bohr's Diplomatic Mission during and after World War Two," *Berichte Zur Wissenschaftsgeschichte* 43, no. 4 (December 2020): 498–99.
[285] Wellerstein, *Restricted Data*, 136.
[286] Cited in Aaserud, "The Scientist and the Statesmen," 20.

Bohr" but were also shared by "battle-hardened policymakers like [John] Anderson and [Lord] Halifax", the chancellor of the Exchequer and the British Ambassador in Washington respectively.[287] They were also shared, to a certain extent, by Roosevelt advisors James Conant and Vannevar Bush. These were inspired by Bohr's remarks and, after having discussed with Roosevelt, both men wrote a memo echoing his points in September 1944.[288] Conant and Bush, like Bohr, recognized outright that any advantage possessed by the US and Great Britain would only be "temporary", and that, in the future "the accidents of research could give another country a temporary advantage as great as the one we now enjoy".[289] Secrecy, like it existed then, was impossible to maintain after the war notably because "some outside the project have undoubtedly guessed a great deal of what is going on". "Partial secrecy", in that case, would only lead to an arms race. Time had come to "meet the unique situation created by the development of this new art" by proposing a free exchange of information under the "auspices of an international office deriving its power from whatever association of nations is developed at the close of the present war."[290]

What Bohr's memo, and Bush and Conant's, make clear is that the invention of nuclear weapons – although, at the time, they were still in the project – was cause for a reinvention of international politics. As Wellerstein puts it, they argued that "a new technology – the atomic bomb – would require a remaking of the world".[291] Since complete secrecy was impossible and bred mistrust, attempts at keeping the "secret" would inevitably lead to an arms race with the USSR. Such an arms race, in their view, could only create insecurity. These debates, it must be noted, were taking place in the highest secrecy. They only involved a handful of men, and in this configuration, scientists, even backed by senior officials, by no means had the upper hand. Only a few days before Bush and Conant sent out their memorandum, Churchill and Roosevelt had agreed on the exact opposite position.

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287 Hymans, "Britain and Hiroshima," 794.
288 Wellerstein, *Restricted Data*, 138.
289 Vannevar Bush and James Conant, "Salient Points Concerning Future of Atomic Bombs, September 30, 1944," in *The Essential Writings of Vannevar Bush*, ed. Pascal G. Zachary (New York: Columbia University Press, 2022), 95–96.
290 Bush and Conant, 96–97.
291 Wellerstein, *Restricted Data*, 139.

ii. The monopolists' first victory: the Hyde Park Memorandum (September 1944)

Niels Bohr had the opportunity to meet both Winston Churchill and Franklin D. Roosevelt, in 1944. To both these men, he made his case for international control and failed, twice. The reason for his failures is threefold. There exists an impressive consensus in the literature regarding Bohr's inability to communicate clearly and, more generally, to be understood by his interlocutors.[292] Moreover, when he met Churchill – in a meeting famous for how bad it went – he caught him in the middle of D-Day preparations when the British leader likely was not immediately concerned with Bohr's problem.[293] But, more importantly, he failed because his interlocutors had already made up their minds as earlier events foretold.

By 1942, the UK program was lagging. British policymakers chose to join the American project, instead of pursuing it on their own. At the time, it had much to offer in terms of knowledge, particularly regarding gaseous diffusion plants.[294] In a meeting with Roosevelt on June 19, 1942, Churchill decided that both states would cooperate and build a common research plant in the United States, the British Isles being under the threat of German bombers. In this unwritten agreement, "the partners were to be equal; they were to share fully the results".[295] Yet, 6 months later, Roosevelt took the sudden and unilateral decision to cut off the British from any information exchange.[296] He did not make this decision alone: many in the Manhattan Project had started to doubt the US-UK relationship. British scientists were regarded with suspicion by Groves, who took command of the project in September 1942 and could not bring himself to trust these foreigners – with the notable exception of William Penney.[297] James Conant and Vannevar Bush, the President's closest scientific advisors, also started doubting the

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[292] To cite a few, Bundy, *Danger and Survival*, 115; Hymans, "Britain and Hiroshima," 781; Wellerstein, *Restricted Data*, 136.
[293] Aaserud, "Niels Bohr's Diplomatic Mission during and after World War Two," 505.
[294] Richard G. Hewlett and Oscar E. Anderson Jr., *A History of the United States Atomic Energy Commission. Volume I: The New World, 1939/1946* (University Park, Pennsylvania: Pennsylvania State University Press, 1962), 260–61.
[295] Hewlett and Anderson Jr., 261.
[296] Farmelo, *Churchill's Bomb*, 223.
[297] Ferenc Morton Szasz, *British Scientists and the Manhattan Project: The Los Alamos Years* (Basingstoke: Macmillan, 1992), 9.

benefits of the British contribution if the work was to be finished quickly.[298] But an overarching diplomatic consideration presided over that choice. Roosevelt was under the impression that the recent Anglo-Russian agreement on the exchange of new weapons might allow flows of nuclear knowledges into the USSR. As Barton Bernstein has shown, the president could not accept such a transfer of information as he had already started considering the post-war implication of the bomb, and its use to "maintain the peace of the world".[299] With that choice, secrecy was becoming more than a wartime necessity: it was a tool for world ordering. The US-UK quarrel over nuclear secrecy ended in August 1943. By this time, including Britain in the project had become less costly.[300] Roosevelt seemingly still desired a post-war atomic monopoly but no longer considered the UK to be a serious threat to this situation. Roosevelt and Churchill signed the Quebec agreement, officially restarting cooperation. They disposed, notably, that neither party could "communicate any information about TUBE ALLOYS to third parties except by mutual consent".[301] The British, clearly the junior partner, could obtain information anew but only on the condition that it be kept secret – particularly, from the Russians.

Roosevelt strongly tilted toward keeping a nuclear monopoly and Churchill followed his lead after 1943. As Martin Sherwin puts it, Roosevelt understood that the bomb might "be used to create a more peaceful order" but "he seems to have considered the threat of its power more effective than any opportunities it offered for international cooperation".[302] As for the British Prime minister, "the argument that a new weapon created a unique opportunity to refashion international affairs ignored every lesson Churchill read into history."[303] Both men shared an understanding of world affairs – of the logic of history, even – in which security competition seemed unavoidable. This state of affairs might not be deemed desirable,

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[298] Bush and Conant also suspected the British to be using the cooperation as a pathway toward postwar commercial advantages, something they could not condone if it meant risking the security of the program. Hewlett and Anderson Jr., *The New World*, 265; 275..
[299] Barton J. Bernstein, "The Quest for Security: American Foreign Policy and International Control of Atomic Energy, 1942-1946," *The Journal of American History* 60, no. 4 (March 1974): 1005.
[300] Campbell Craig and Sergey Radchenko, *The Atomic Bomb and the Origins of the Cold War* (New Haven: Yale University Press, 2008), 13.
[301] "Final documents of the first Quebec Conference", *FRUS*, Conferences at Washington and Quebec, 1943, 1117-1119.
[302] Martin J. Sherwin, "The Atomic Bomb and the Origins of the Cold War: U.S. Atomic-Energy Policy and Diplomacy, 1941-45," *The American Historical Review* 78, no. 4 (October 1973): 954.
[303] Sherwin, 958.

but it was what it was. As wrote Churchill, “any power that gets hold of the secret will try to make the article and this touches the existence of human society. This matter is out of all relation to anything else that exists in the world”.[304] Since the US and, to a certain extent, the UK possessed “the secret”, they were entitled to use it as they saw fit.

But this required keeping the secret. In that regard, they could not be more opposed to the international controllers. As long as the secret could be kept, the advantage offered by nuclear weapons could be used to realize the Anglo-American – but mostly American – diplomatic goals. What came after was however far from clear. Neither Roosevelt nor Churchill seemed to have truly thought the problem through beyond the immediate postwar period, during which the two men sought to craft a new world order, which would consist of “four policemen, but only two of them would have the bomb”.[305] This policy was consecrated in the Hyde Park memorandum, signed on September 19th by the two leaders. In many regards, this memorandum is of great importance. It was the first official high-level document that arrested a decision on nuclear use over Japan. The document also emphasized the importance of secrecy, twice. First, about the necessity to carry on with the *Tube Alloy* work in “utmost secrecy”. Second, in a bizarre addendum to the memorandum worth being quoted in full: “Enquiries should be made regarding the activities of Professor Bohr and steps taken to ensure that he is responsible for no leakage of information, particularly to the Russians.”[306] The singling out of Niels Bohr in such a historical document is anything but expected. Septimus H. Paul has explained it by “the cavalier and impulsive manner in which this document was drawn up” and the fact that neither man consulted his advisers on the issue.[307] Jacques Hymans, to the contrary, proposes a more subtle explanation according to which it was a way for Churchill to reprimand his own officials – particularly Anderson – by making explicit the consequences of supporting plans for atomic control.[308] Churchill, however, also wanted to make an example of Bohr against whom he seemed to now hold a personal grudge. Writing to Lord Cherwell

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[304] Cited in Sherwin, 958.
[305] Sherwin, 954.
[306] Aide-Mémoire Initialed by President Roosevelt and Prime Minister Churchill, 9th September 1944, *FRUS*, Conference at Quebec, 1944, 493
[307] Septimus H. Paul, *Nuclear Rivals: Anglo-American Atomic Relations, 1941-1952* (Columbus: Ohio State University Press, 2000), 66–67.
[308] Hymans, “Britain and Hiroshima,” 783.

after the Hyde Park Meeting, he considered that "Bohr ought to be confined or at any rate made to see that he is very near the edge of mortal crimes."[309] The addendum is evidence of the importance, for Churchill and Roosevelt of both maintaining secrecy and simultaneously crushing the nascent international control movement.

Following the memorandum, and until Hiroshima, the nuclear program grew only more secret. This clash with the evolution of the political context in Europe. After the end of the European war, keeping secrets became much more difficult than before for the British state, confronted with both the limitation of what it could ask of the press and the growing demands from its American ally. The publication of an article on a secret British operation against Norwegian heavy water plants, would rapidly test the limits of the policy. On May 21st, 1945, E.D. Masterman published an article in the *Daily Express* on British efforts to stop Nazi attempts at producing heavy water for their nuclear research program. These efforts took the form of multiple top-secret sabotage missions which eventually succeeded in depriving Nazi scientists of a substantial amount of heavy water.[310] This article, in itself, revealed little about the secret race toward the bomb – so little that a French journal picking up on that story would run as a headline "And there was no atom bomb".[311] A similar story had been censored before by the British authorities, "on the grounds that [it] discussed a military action which purported to have taken place in enemy-occupied territory."[312] But, by May 1945, the enemy was no more and there existed no justification for censoring the story which, in any case, was no secret to the German enemy. For the Ministry of Information, the story was in accordance with existing rules because "only those stories which contain technical details or new matter not already known" had to be referred for censorship.[313] But, as a civil servant wrote, "the danger of this article is not that it reveals any new technical information, but that it provides further evidence for the interest of the British government in atomic fission. The most serious aspect of the matter is that it is bound to create troubles with the Americans"

309 Cited in Sherwin, "The Atomic Bomb and the Origins of the Cold War," 959.
310 "Now it can be told. Secret army fought Nazi atom bomb", *Daily Express,* 21st May 1945.
311 « Et il n'y eut pas de bombe atomique », Paris-Presse, 27th June 1945.
312 Letter from the Directorate of Tube Alloys to the Privy Council Office, "T.A. Censorship", 29th March 1944, Most Secret, CAB 126/302, TNA.
313 Minute to the Chancellor of the Exchequer, 2nd June 1945, Top Secret, CAB 126/302, TNA

and particularly with Groves, whose "inevitable complaint" had to be "forestall[ed]".[314] In mid-May, British officials had promised that their arrangement for keeping secret the Tube Alloy program "would not be in any way altered be the end of European war."[315] In fact, the US became more demanding after the victory in Europe, and British civil servants confessed to being "rather puzzled during the past weeks at the degree of anxiety shown by General Groves on this question of censorship" by July 1945.[316]

The pressure was so great that Rear Admiral Thomson, in charge of information control, promised to refer "any" article mentioning atomic bombs to the authorities before publication, and to give the American desires as a justification for such censorship.[317] By June 1945, a direct order was given so that "all stories referring to atomic bombs will be stopped regardless of whether or not they repeat information which already been published", except for those discussing the "distant future".[318] The justification for such censorship, by this point, was not that "the stories contain information useful to the enemy", but "the danger lie[d] in stimulating speculation in the American press" which could "in turn lead to disclosure of the American effort, which may prejudice the success of the project over a period when the utmost secrecy is essential".[319] Leaders had decided that the possibility of nuclear weapons should be kept secret not only to facilitate their use in Japan, their bargaining or coercive value in the post-war period. Secrecy therefore had to be maintained at all costs, even after the defeat of the Nazi adversary –who had originally motivated the race for the bomb.

The Hide Park memorandum can be seen as a key document in the history of nuclear secrecy. In refusing to share any information with the Soviets and singling out Bohr for the threat he could represent for such a scheme, it firmly established the fact that only one of the two alternatives for security in a post-war nuclear order would be favored. Putting a rubber stamp on the policy of keeping Stalin in the dark, a policy which would be pursued until Potsdam, the document played a major role in the origins of the

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314 Minute for the Chancellor of the Exchequer, 22nd May 1945, Top Secret; Telegram from AMSSO to Washington, 22nd May 1945, PEW 388, Top Secret, CAB 126/302, TNA.
315 Minute for the Chancellor of the Exchequer, 22nd May 1945, *op. cit.*
316 Minute for the Chancellor of the Exchequer, 17th July 1945, Top Secret, CAB 126/302, TNA.
317 Letter from M.W. Perrin (Tube Alloys) to D.H.F Rickett (War Cabinet), 5th June 1945, Top Secret, CAB 126/302, TNA
318 Letter from M.W Perrin to D.H.F Rickett, "Press Censorship", 15th June 1945, Secret, CAB 126/302, TNA
319 Telegram from Washington to AMSSO, 13th June 1945, ANCAM 292, Top Secret, CAB 126/302, TNA

cold war. Its importance, however, must be nuanced by the fact that of the two men who put their initials on the original documents, none was left in power when the war ended. At the same time, none of their successors had any idea that their government was building such weapons upon entering offices – respectively, in April 1945 for Harry Truman, and July 1945 for Clement Atlee. And yet, their policy after the war effectively followed the direction taken in September 1944.

b. Fateful year: the failure of international control and the choice of secrecy (August 1945 – August 1946)

After Hiroshima and Nagasaki, and after victory in the Pacific war, the two main political rationales for secrecy disappeared: the war was over, and the atomic bomb was not a secret anymore. This opened up new possibilities. If, during the war, no one really debated the idea of secrecy – what was debated was only the idea of secrecy *toward the Soviets* – many now pushed in favor of transparency. The atomic bomb, they argued, was the only real secret. Now that it was out, "some secrecy would necessarily persist, but that most of the wartime secrecy had been a temporary expedient", or so they thought.[320] The idea of international control, and of a different attitude toward secrecy, was possible. Yet, it failed, and secrecy got entrenched. This section aims to show how the entrenchment of secrecy was not merely an actors' choice, but also an effect of the profound security implications of nuclear knowledges. I argue that the choice of secrecy was not necessary but certainly overdetermined by historical circumstances.

i. International control and its discontents

Three days after the destruction of Nagasaki, a US official report on "A General Account of the Development of Methods of Using Atomic Energy for Military Purposes" was issued. Written by physicist Henry DeWolf Smyth, the report would later be remembered simply as the "Smyth report". Groves had wanted the report as an information mechanism for Congress, to avoid liability in case the project turned out to be a failure. It described the basic physics of the project as well as its general

[320] Wellerstein, *Restricted Data*, 135.

organization and announced a step toward publicity in the nuclear field.[321] Evidence of the American leadership over the definition of secrecy's boundaries, the report was declassified without consultation with the British. The world, and not simply a handful of policymakers and scientists in the US, was now facing the problem of security in the nuclear age. As Sherwin beautifully put it, "By raising the consequences of war to the level of Armageddon, the atomic bomb elevated the stakes of peace beyond historical experience" – and hence called for action.[322] International controllers and nuclear monopolists entered the scene anew – this time, publicly.

Neither Roosevelt nor Churchill were great believers in the international control solution. But neither men were in power after Hiroshima. In the US administration monopoly found a great supporter in Groves, who exerted a strong influence over Truman and held a unique position as "perhaps the only person to know all the Manhattan Project's secrets" and who exerted a strong influence over Truman.[323] Groves, however, was not necessarily a fervent supporter of secrecy. Contrary to a prevalent idea, it does not seem that Truman or Groves truly believed that there existed *an* atomic secret, that is a few pieces of information which could realistically be concealed in order to fully prevent the spread of nuclear weapons.[324] Groves held the firm belief that the secret of the bomb was "a secret that cannot be held; it is just a question of time".[325] Nuclear monopolists, who did not form a cohesive group but represented a general foreign policy stance, rather believed that secrecy was necessary to *stall* the Soviet efforts toward an atomic bomb, which would have allowed the US to benefit from a nuclear head start over the rest of the world. International controllers, represented prominently by the newly created Scientists' movement, believed in Bohr's ideas: that secrecy was a liability, and that the invention of nuclear weapons called for a new organization of the world based on transparency. In any case, as Harry Truman expressed in his statement to Congress in October 1945, something had to be done *because of*

[321] Although the Smyth Report revealed little about how to design a bomb, it revealed a lot about how to design a bomb *program* and turned out handy for the Soviets – and, later, the French too. Gordin, *Red Cloud at Dawn*, 99.
[322] Martin J. Sherwin, *A World Destroyed: Hiroshima and the Origins of the Arms Race* (New York: Vintage Books, 1987), xiii.
[323] Herken, *The Winning Weapon*, 111.
[324] An idea present, notably, in Shane J. Maddock, *Nuclear Apartheid: The Quest for American Atomic Supremacy from World War II to the Present* (Chapel Hill: University of North Carolina Press, 2010), chap. 2.
[325] Cited in Wellerstein, *Restricted Data*, 147.

the bomb, an invention that "involves forces of nature too dangerous to fit into any of our usual concepts" and called for "immediate action".[326] But what had to be done? The debate went well beyond the US, but US officials were the ones who mattered: they had nuclear weapons and of its "secrets". While they could not impose an international control scheme, they were the only ones who could decide about secrecy.

Still British leaders also leaned toward keeping secrets. In September 1945, Attlee and his advisers appeared relatively open to an international control scheme that would have required sharing nuclear knowledges at least with the Soviets. Writing to Truman on that month, Attlee urged him to consider the "momentous problem" of international control now, before distrust could grow with the Soviets. His Foreign Secretary, Ernest Bevin, argued that such a trust could be built in one way: the sharing of information about the nuclear project. For him, the UK had "everything to gain and little to lose by making Russia party to knowledge of the atomic bomb process". Transparency, rather than secrecy, would favor trust and help meet the challenges of the 'momentous problem' posed by the atomic bomb. Consequently, Britain should "take the risk of giving this information to the Russians in the interests of foreign policy".[327] Less than a month later, however, his opinion had changed, and so did Attlee's: they now believed that the USSR's position toward Western Europe would likely remain unchanged, regardless of what they shared, or hid.[328]

Yet again, debates about the virtues of international control were, in essence, debates about the relationship between secrecy and security.[329] Both sides agreed on the problems posed by information control in a nuclear world, but they diverged on what to do. Those favorable to international control preferred to keep no secrets, as they would create insecurity and mistrust between states. For those

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326 " Message to Congress on the Atomic Bomb", 3rd October 1945, [available online at: https://www.atomicarchive.com/resources/documents/deterrence/truman.html.]
327 John Baylis and Kristan Stoddart, *The British Nuclear Experience: The Role of Beliefs, Culture, and Identity* (Oxford: Oxford University Press, 2015), 22.
328 Baylis and Stoddart, 22–23.
329 There was, to this debate on secrecy, a third side, which linked transparency and security through an argument on the negative effects of secrecy on scientific innovation, arguing that "if the United States wants to maintain her advantage in an armament race, the opinion of the scientists has to be heard". Letter from James Franck to David Lilienthal, 20th September 1945, David Lilienthal Papers, Mudd Library, Princeton, box 108. Thanks to Benoit Pélopidas for this document.

opposed to it, the opposite was true: because full transparency was impossible, certainty about other countries' nuclear status was impossible to attain meaning that security required keeping nuclear secrets. While the international controllers advocated for transparency regarding the US arsenal and atomic bomb knowledges, the nuclear monopolists saw perverse effects in that idea. First, the Joint Chiefs of Staff, in a memorandum meant as a guidance for the negotiations on international control to be held in the newly created United Nations Atomic Energy Commission noted that "no system of inspection can be expected to be one hundred percent effective in such a world, and ninety-nine percent effectiveness is no guarantee".[330] In other words, solutions based on transparency could *not* offer security because full transparency was impossible. The marginal destructive potential of any atomic bomb was exceptionally high, and a small number was enough to create worldwide insecurity. Actors now had to face what Bernard Brodie called in 1946 the twin facts of the nuclear age: that the atomic bomb "exists and that its destructive power is fantastically great".[331] Contrary to the international controllers, nuclear monopolists believed that security in the atomic age simply required statesmen to adapt their security policies, without shying away from great power competition.[332]

In a memo written in January 1946, Groves considered that any credible plan for international control "must provide for complete information at all times as to the activities of all nations in the atomic field", which "means the abandonment of all rights of privacy – that of the home, the laboratory and the industrial plant throughout the world including the United States".[333] The argument was exaggerated and probably fed on certain senators' distastes at the idea of letting Soviet inspects enter their state.[334] Yet, Groves had a point: any system of inspection would prove extremely intrusive. The level of effort required from an international control regime to work was simply enormous. The fact that the two main actors involved – the US and the USSR – were not particularly willing to do any only made things worse.

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[330] Memorandum by the Joint Chiefs of Staff to the State–War–Navy Coordinating Committee, "Guidance as to the Military Implications of a United Nations Commission on Atomic Energy", 23rd January 1946, Top Secret, FRUS, 1946, The United Nations, vol. I, 744
[331] Brodie, *The Absolute Weapon*, 52.
[332] Walker, *A Perpetual Menace*, 49.
[333] Memorandum by the Commanding General, Manhattan Engineer District (Groves), 2nd January 1946, Confidential, FRUS, 1946, The United Nations, vol. I, 1198
[334] As, for example, Kenneth Mc Kellar which opposed the idea of Soviets inspectors coming to his state, Tennesee, to inspect on Oak Ridge. Mallard, *Fallout*, 47.

Even if control was possible, it seemed potentially undesirable because it would be an unprecedented blow to the state's sovereignty. One should not overinterpret these declarations made by actors with an obvious vested interest, willing both to keep nuclear weapons and to keep control over them. Yet, even with this fact considered, these remarks point to an important fact with which the official report of the United Nations Atomic Energy Commission (UNAEC) issued in early 1947 concurred, that the "clandestine manufacture of atomic weapons (…) would be extremely difficult to discover".[335] It remained "technologically feasible"[336] but costs would be very high.

By late 1945, everyone understood the challenge posed by the invention of nuclear weapons but not all were in agreement about what should be done about it, as not all saw it in the same manner.[337] An international control regime was imaginable, and it had supporters. Yet, by early 1947 it was cruelly plain that there was no prospect of any agreement.[338] The year 1946 tuned out to be, as Alex Wellerstein noted, a "liminal year" when nuclear secrecy eventually became entrenched.[339]

ii. The McMahon Act and the entrenchment of secrecy

At the UN, in 1946, two plans were put forth for a nuclear-weapon-free world: the Baruch and the Gromyko plans. These were proposed in the context of the UNAEC, established by the UN General Assembly's first-ever resolution.[340] The Baruch Plan was a revised version of an earlier report, the Acheson-Lilienthal report, whose primary author probably was Robert Oppenheimer. It outlined a plan for the gradual transfer of knowledge, material, and bombs to an international body while establishing inspection mechanisms. Unfortunately, the plan provided no description of how such a body, or its

[335] The first report of the Atomic Energy Commission to the Security Council, 3rd January 1947, AEC/18/Rev.1, 47 [available online at: https://digitallibrary.un.org/record/742672.]
[336] *Ibid.* 15.
[337] On the competing and sometimes contradictory views on the nuclear challenge, see Benoit Pelopidas, "Quelle(s) Révolution(s) Nucléaire(s)?," in *L'enjeu Mondial. Guerres et Conflits Armés Au XXIe Siècle*, ed. Benoit Pelopidas and Frédéric Ramel (Paris: Presses de Sciences Po, 2018), 93–103; Fritz Bartel, "Surviving the Years of Grace: The Atomic Bomb and the Specter of World Government, 1945-1950," *Diplomatic History* 39, no. 2 (April 1, 2015): 275–302.
[338] Bundy, *Danger and Survival*, 130.
[339] Alex Wellerstein, "Liminal 1946: A Year in Flux," *Restricted Data: The Nuclear Secrecy Blog* (blog), 2013, http://blog.nuclearsecrecy.com/2013/11/08/liminal-1946/.
[340] Walker, *A Perpetual Menace*, 44.

inspection, could work.[341] A revised version of this project was presented by Bernard Baruch to the UNAEC, where it was rejected by the Soviet Union as it did not trust the US to give up their weapons. The Baruch plan, indeed, provided that the US would disarm only *after* the construction of an international body. The Gromyko plan, the Soviet counterproposal to the US, hence proposed the invert the sequencing of the disarmament.[342] This plan, this time, was rejected by the Americans. Trust between the two countries had waned, especially after revelations of Soviet espionage in the US.[343] Due to a lack of agreement over plans that seemed realistic enough, they were eventually abandoned. As the late Nathan Sears put it, national securitization of atomic energy triumphed over its macro-securitization at Humanity's level. The "fear of 'the Other' overshadowed fear of 'the Bomb'" eventually.[344] The abandonment of those plans, however, does not mean that their realization was impossible. It would have been a costly bargain, but not an impossible one. It would have required, as Wellerstein put it, a remaking of the world, binding states together with exceptional obligations to create restraints over nuclear violence. Had it succeeded, the link between nuclear knowledges and secrecy would have been broken, even inverted as security would have required to be transparent in to avoid suspicions of dissimulated arsenals. But it failed, and security through transparency was replaced by security through secrecy.

In August 1946, the United States switched to domestic forms of control over nuclear knowledges as a solution for security. This shift was embodied by the McMahon Act. Astutely, Walker notes that the McMahon Act adopted "the model of public ownership proposed in the Acheson-Lilienthal Report (…), but by a single state rather than the community of states".[345] Through this act, the US was locking its nuclear vault and, with it, the doors to international cooperation. It proposed an alternative model for the governance of nuclear knowledges and, hence, of nuclear weapons worldwide, a regime relying not

[341] Walker, 46.
[342] Kjølv Egeland, "Nuclear Abolition from Baruch to the Ban," in *Research Handbook on International Law and Peace*, ed. Cecilia M. Bailliet (Chelthenham: Edward Elgar Publishing, 2019), 252.
[343] On the failure of the Baruch Plan, see David W. Kearn, "The Baruch Plan and the Quest for Atomic Disarmament," *Diplomacy & Statecraft* 21, no. 1 (March 12, 2010): 41–67.
[344] Nathan Alexander Sears, "Great Power Rivalry and Macrosecuritization Failure: Why States Fail to 'Securitize' Existential Threats to Humanity" (Doctoral Dissertation, Toronto, Universty of Toronto, 2023), 157.
[345] Walker, *A Perpetual Menace*, 51.

on an international body, but on the making of domestic institutions able to keep secrets from future competitors – primarily, but not only, the Soviets. Instead of remaking the world, it intended to remake the State or parts of it, by creating new institutions to face the challenge posed by nuclear weapons.

The origins of the McMahon Act lay not in plans for international security *per se* but in debates about domestic control of the newly born nuclear industry. How could this new industry, built entirely on black budgets and outside any form of oversight, be normalized? A first project, the Royall-Marbury bill, proposed a drastic state control over both nuclear research and nuclear knowledges, without direct reference to national security. Pushed forcefully by Truman, the bill crashed against the nascent Scientists' movement, which defended a less restrictive vision of nuclear secrecy and scientific freedom. Congressional debates led to the appointment of Senator Brien McMahon, who drove the bill in a different direction. He proposed a very liberal approach to secrecy, insisting on the importance of the free dissemination of knowledges.[346] The Senator's plan stumbled over the sudden revelation of the "Canadian Spy Ring", which gave a different turn to ongoing congressional debates. The Canadian Spy Ring began after Igor Gouzenko, a cipher clerk at the Soviet Embassy in Ottawa defected to Canada. His defection, as Dennis Molinaro writes, happened "after he had made a series of small errors on the job, [and] his superiors wanted him shipped back to the Soviet Union" something he did not want to experience as "he feared his fate, but also had become accustomed to living in Canada".[347] He fled with a large number of documents on Soviet efforts to infiltrate the Manhattan Project. His revelation led to the uncovering of a spy ring, some of them British. The revelations, in themselves, were rather mild: there was no evidence of major security breaches. However, some actors saw an opportunity in this scandal. The first were the British, who hoped breaking the story would increase hostility toward the Soviets while allowing them to "quietly escape the potential scorn of the American public for being a 'leaky' partner when it came to guarding top-secret information".[348] The second was Groves himself, who worried about the direction taken by congressional debates – Alex Wellerstein considers that "there

[346] Wellerstein, *Restricted Data*, 145–51.
[347] Dennis Molinaro, "How the Cold War Began ... with British Help: The Gouzenko Affair Revisited," *Labour/Le Travail*, no. 79 (Spring 2017): 144.
[348] Molinaro, 148.

is reason to believe the news (…) had been leaked to the press by Groves himself".[349] In any case, the Canadian Spy Ring made an impression on the American public, as well as on the American congress and the originally liberal bill was overhauled in a much less liberal direction. It created a unique and unprecedented form of classification, the "restricted data" category.

The exceptional meaning of this category cannot be downplayed: restricted data are data that are secret "*by nature* and not by an act of regulation".[350] This implies that anyone, anywhere, can create restricted data if they were researching "concerning the manufacture or utilization of atomic weapons, the production of fissionable material, or the use of fissionable material in the production of power."[351] This very definition is evidence, too, of the revolution in statecraft introduced by nuclear weapons. As noted by Peter Galison, it implied a "shift in the ontology of secrets".[352] While, before, secrecy regulations focused on material elements, such as maps, plans, blueprints, or military instructions, they now focused on natural knowledges – knowledges of the physical world that can be discovered independently. It is quite revolutionary, and quite vain, for a state to imagine controlling knowledge not only about its activities but about the natural world itself. This is all the more revolutionary if one considers the second implication that, with nuclear secrecy, there is no end date to secrecy: "born secret, some atomic secrets never die".[353] As security depended on the state's ability to maintain its technological edge, secrecy was an imperative, and a demanding one. Nuclear weapons, it was originally believed, would lead to a remaking of the world. They instead led to a remaking *of the state*.

With the Act, the United States also closed the door to most forms of international cooperation. It stated, in essence, that the security of the United States relied on the domestic control of nuclear secrets, and on public ownership of the means of atomic weapons production. The McMahon Act signaled a sharp turn in how US policymakers envisioned a global nuclear order. From international solutions to the problem of the nuclear arms race, they turned to domestic ones. British policymakers, now cut out from

[349] Wellerstein, *Restricted Data*, 152.
[350] Wellerstein, 154.
[351] Atomic Energy Act 1946, section 10 (b)
[352] Peter Galison, "Secrecy in Three Acts," *Social Research* 77, no. 3 (2010): 961.
[353] Galison, "Secrecy in Three Acts."

US secrets, were conscious of that.[354] The difficulty with this policy, however, was incarnated by the notion of *restricted data*: to make sure that nuclear secrecy holds, nuclear weapons-related knowledges had to be under state control always and everywhere. But the US was not the only country engaged in nuclear research. Technically, restricted data was being produced abroad, highlighting the inherent limits of the McMahon Act. To make it work, the US needed to make sure that other nuclear states had a similar handling of those data. US diplomats devoted considerable efforts controlling and pressuring the production of nuclear knowledges abroad, both in the form of technological artifacts – pressuring allies to develop export control policies – and in the form of scientific data – devoting particular attention to the security of their allies. In any case, the absence of an international control regime meant that the security problem posed by nuclear weapons would not just be the US' problem, but the problem of any state engaged in nuclear weapons production. In the absence of a control regime, the nuclear secrecy imperative was an imperative to all.[355] And, as will be discussed in the next chapter, US diplomats and policymakers would make sure to remind any ally forgetful of that imperative.

4. Conclusion

This chapter aimed to explain how secrecy over nuclear knowledges came to be "obviously necessary". It has shown how the invention of a new technology, which became certain with the MAUD report in 1941, triggered unprecedented efforts for secrecy in the UK and the US, which were entrenched after the war. As soon as the possibility of nuclear weapons became a "certainty", actors felt compelled to find solutions for security against them. Technological development constituted the primary driver of actors' behavior. What is exceptional about nuclear secrecy is not the unprecedented levels in reached during the war, but that those wartime practices endured in peacetime. Why? Why did secrecy continue even though what justified it in the first place was no more? I argued that it continued because actors were acutely aware of how the invention of nuclear weapons had changed the environment in which

[354] Matthew Jones, *The Official History of the UK Strategic Nuclear Deterrent, Vol.1* (London ; New York: Routledge, 2017), 3.
[355] Which does not mean that actors could not engage in other forms of information control, such as information overflow – the release of a large number of information to trump and confuse external actors. However, such stratagem would only have been a complement to secrecy, since its goal would have been to prevent the enemy from acquiring the "true" information which remained concealed.

they operated. Because nuclear weapons created the possibility of prompt and utter destruction everywhere, the emergency and the vulnerability of wartime became a permanent feature of interstate relations and. Humanity entered a state of permanent vulnerability to nuclear destruction, which shattered the boundaries between war and peace, a state that French strategist General André Beaufre called "*la paix-guerre*" (the peace-war).[356] In such a context, where nothing offered restraint to nuclear violence, nuclear knowledges – the basic pieces for nuclear weapons production – became vested with important security implications, and secrecy became an imperative for security *even in peacetime*. But this imperative was not technologically determined, and it was not immediately made by actors. There were, in fact, other possibilities available, but they chose not to pursue them. This choice certainly was, in a way, overdetermined by the difficulties implementing an international control regime would pose with actors such as the USSR. Moreover, it also implied rethinking the very idea of sovereignty. They certainly, too, were influenced by the actors' imagined futures, and the fact that these futures seemed to feature the perpetual possibility of a Hitler-like figure against which those weapons would be necessary. Alternatives were costly, and required efforts, but not impossible. Moreover, these difficulties were not determined by technology. Nuclear weapons only required actors to make choices, and they chose secrecy.

This chapter sought to establish the causal field in which officials from the United Kingdom, France, and Sweden, would when launching their nuclear program in the post-war years. This causal field was characterized by the absence of international political arrangements which could offer restraints over nuclear violence, and a US desire to keep nuclear knowledges under strict control. It was characterized, in other words, by a structural constraint in favor of secrecy. In the next chapter, I turn to the study of

[356] André Beaufre, *Introduction à la stratégie* (Paris: Pluriel, 2012), 23. Interestingly enough, Beaufre developed this idea *before* the invention of nuclear weapons, in an August 1939 article and referred initially to something different than what he meant later in his *Introduction to Strategy.* (André Beaufre, "Une Forme Nouvelle Des Conflits Internationaux: La Paix-Guerre," *Revue Des Deux Mondes* 52, no. 4 (August 1939): 766–89.) As the foremost historian of Beaufre's thought note, Beaufre saw an opportunity to claim a continuity in his thought which was, in fact, much less obvious as the material conditions he was referring to had changed radically in the meantime. Hervé Pierre, "Paix-Guerre : Le Monde Selon André Beaufre," *Inflexions* 36, no. 3 (2017): 104–5.

the beginnings of nuclear research in each of those three countries and show how this constraint affected the development of each states' nuclear program.

Chapter 3: Determinants of nuclear secrecy regimes.

Technological imperatives, foreign pressure, and domestic choice in the origins of nuclear secrecy in the United Kingdom, Sweden, and France.

When British, Swedish, and French officials decided to pursue a nuclear weapon program, they did so secretly. For some years, the very existence of such a program was not revealed to the public, and nuclear policy was a matter discussed behind closed doors. Neither nuclear weapon research, nor decision-making, was a matter of public discussion. This chapter's purpose is to provide evidence for the causal link between nuclear weapons pursuit and domestic structural change. The main contention of this dissertation is that the process of nuclear weapons pursuit creates constraints over actors, which constitutes state structures in a specific way – in that case, by leading to the development of nuclear secrecy regime. Studying closely the process of decision-making in those three states, I ask the question: why did state officials decide to develop nuclear secrecy regimes? In the first chapter, I defined secrecy regimes as sets of institutions, procedures, rules, and practices designed to keep certain people from obtaining certain pieces of information one does not want them to have. Secrecy is a product of information control: it results from a process of control over who gets to know what in a given field. The puzzle here is to explain why state actors decided to implement such processes, and over what scope.

My answer is that actors faced structural constraints which shaped their environment. They developed nuclear secrecy regimes because they *had to.* The first constraints were material and related to the agentic capacity of nuclear technology: as states advanced toward the militarization of nuclear research, they were confronted with the problem that the knowledges produced in state laboratories had security implications. They could serve other states in their quest toward nuclear weapons or reveal much about states' capabilities, in a world without any international control regime. In the previous chapter, I have argued that the absence of international control over atomic energy created an imperative of secrecy over nuclear knowledges. In this chapter, I show how this imperative translated into changes in state structures, leading to the emergence of nuclear secrecy regimes. Nuclear secrecy, in the world where actors operated, was the only solution available for security.

On its own, this constraint, however, is insufficient to explain actors' decision to shroud nuclear policy in secrecy or, more specifically, it does not account fully for the boundaries of the secrecy regimes. I argue that a second constraint must be accounted for to explain state actors' behaviors: the pressure coming from US hegemony. After the passing of the McMahon Act, US diplomats were confronted with the fact that the US were was not alone in doing nuclear research and that information considered secret in America might not be seen as such abroad – which defeated the purpose of restricted data. Therefore, they engaged in diplomatic efforts to pressure allied states into accepting stricter secrecy measures. US hegemony, I argue, was a secondary constraint to secrecy. Though it cannot be considered the primary cause of nuclear secrecy regimes, it explains why they sometimes went beyond what the states implementing them considered necessary for security.

But to stop there would not provide a full answer to the question. Those constraints explain only why actors kept secret the *content* of their nuclear policy, that is technical knowledges. Simply put, they explain why nuclear research became classified. It does not explain why they also kept secret its *purpose*, as being oriented toward the production of nuclear weapons - a political secret. Why did state officials conceal that fact? This, I argue, was a choice: decision-makers sought to avoid potential challenges either domestic or foreign, and used secrecy to conceal their political choice. This shows how technical and political secrecy can hardly be separated. Since practices of information control allowed the concealment of nuclear policy's content, it was also possible to leave its true purpose unsaid. The "secrecy imperative" was therefore not only a constraint: it also offered opportunities, notably the opportunity of bypassing democratic debates.

Consequently, as this chapter will attempt to demonstrate, state officials developed nuclear secrecy regimes because they had to. Nuclear knowledges came with security implications, and even when they did not, they had diplomatic implications. State officials responded to external constraints which resulted from the agentic capacity of nuclear weapons. This, however, is only valid regarding what I call the minimal boundaries of secrecy, that which had to be kept secret because of the specific environment in which actors evolved. However, the maximal boundaries of secrecy, that is where secrecy stopped, were

still at the actors' discretion. Actors had little choice regarding the content of their policy but could choose to be public about its purpose.

The question of *why* actors shrouded their nuclear program in secrecy has not been taken seriously by the literature, as if it was so obvious as to deserve no explanation. In a recent survey on how states pursued nuclear weapons, Vipin Narang links secrecy with a desire to prevent external coercion which could derail their program.[1] This, however, is mostly true for latecomers, such as India or Pakistan, and does not account for state actors' concerns over domestic protests.[2] In historical accounts of each program, the question of secrecy is certainly not ignored, but usually unproblematized. Authors rarely ask the question or usually rely on domestic politics-centered explanations. For example, Daniel Salisbury, though acknowledging the weight of technological and diplomatic factors on British policymakers does not study those specifically and focuses on party politics to explain variations in nuclear secrecy politics.[3] Thomas Jonter, in his authoritative history of the Swedish nuclear weapons program, acknowledges that secrecy was driven by domestic concerns but leaves this question out of the scope of his analysis.[4] In France, Dominique Mongin similarly links secrecy with the CEA's desire for autonomy.[5] Though none of those explanations are incorrect, none of them attempt to account for the role of technology's agentic capacity in the making of those choices. They explain variations in the boundaries of nuclear secrecy regimes, not the existence of those regimes. This chapter attempts to provide a more detailed account of the origins of nuclear secrecy regimes, accounting for the plurality of factors that made them come about.

It is based on primary sources, many of them untapped and shed light on a rarely studied period in French and Swedish nuclear history. The British case is well-studied, allowing to use secondary sources with more confidence, although I have also relied on archives as well. For the Swedish and French case,

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[1] Vipin Narang, *Seeking the Bomb: Strategies of Nuclear Proliferation* (Princeton: Princeton University Press, 2022), chap. 2 in particular.
[2] On secrecy in the Indian program, see Kampani, *India's Nuclear Proliferation Policy*.
[3] Salisbury, *Secrecy, Public Relations and the British Nuclear Debate*, 17–18.
[4] Jonter, *The Key to Nuclear Restraint*, 46–47; 134–35; Jonter, "Sweden and the Bomb. The Swedish Plans to Acquire Nuclear Weapons, 1945-1972," 29–30. The same can be said about Wilhelm Agrell who adopts an essentially descriptive position. Agrell, *Svenska Förintelsevapen*, 53–55.
[5] Mongin, "La Genèse de l'armement Nucléaire Français. 1945-1958.," 89.

the scarce literature on the early years of the Swedish and French program and the absence of literature on nuclear secrecy specifically requires giving a detailed accounts of the decision-making process surrounding nuclear secrecy. For Sweden, I have relied on the *Atomkommité*'s archives as well as archives from FOA (*Forsvarets forskningantalt)*, Sweden's military research organization. For France, for lack of access to CEA archives, I relied on private archives from Raoul Dautry and Frédéric Joliot Curie, and archives from the CNRS (National Research center) as well as the military.

It is organized into four sections. In the first section, I outline in more detail my argument about the causal constraint of technology and hegemony. Then, I turn to case studies. In each case, I study the process which led state officials to shroud nuclear policy in secrecy to determine how those causal constraints affected actors' decision-making. The comparison between cases allows for a better assessment of what role each mechanism played in the observed outcome. Though domestic and diplomatic mechanisms varied, the role of technology as a material constraint remains the same over cases, confirming that the pursuit of nuclear weapons causes changes in state structures.

1. Technology, hegemony, and domestic politics: causal constraints and agency in the making of nuclear secrecy regimes.

In this section, I present the logic of my argument in more detail. I argue, first, that the core cause of nuclear secrecy lies in nuclear technology itself, and its inherent security implications. However, to say that technology "caused" state officials to develop a secrecy regime is an oversimplification. Indeed, nuclear technology functioned as constraints, which do not cause, but rather shape the universe of possibilities of actors by making certain choices much more costly than others. Moreover, the causal chain toward nuclear secrecy regimes cannot be reduced to the causal constraints of material factors. Social constraints, in the form of US diplomatic pressure, also need to be accounted for. Finally, I argue, the actors' agency cannot be taken out of the picture as it can serve to explain why some elements which seemingly did not *have* to be secret ended up being. I, therefore, argue that three mechanisms must be articulated to explain the outcome: the agentic capacity of technology, hegemonic diplomatic pressure, and domestic choices. This argument is summarized in the following figure:

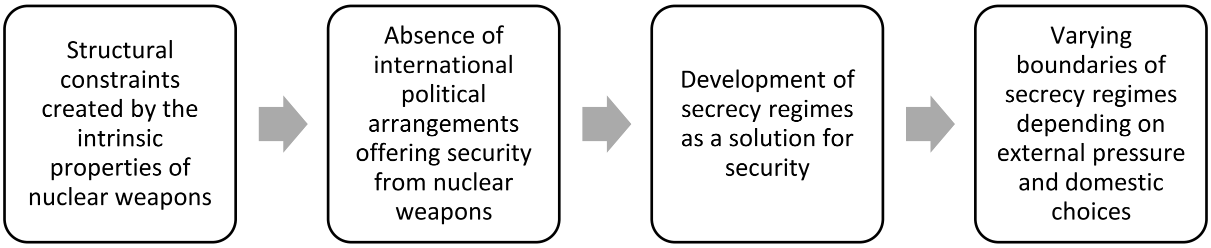

Figure 5 - The causes of nuclear secrecy.

The first claim of this chapter is that nuclear weapons technologies have an agentic capacity, that is, an ability to "participate" in social relations and to shape the environment of actors. They "authorize, allow, afford, encourage, permit, suggest, influence, block, render possible, forbid, and so on"[6]. This does not mean that they act for themselves, but their presence does change the configuration in which actors operate. They do not have agency, as they do not move through social structures, but they do participate in their constitution. Their introduction in a particular social system can hence cause change as actors must account for the ways these artifacts create constraints or opportunities which would not exist otherwise. The first cause of nuclear secrecy should therefore be found in the structural effects of technology. As Craig Parsons put it, a structural explanation claims that "people choose their actions as a direct function of what is taken to be a concrete, exogenously given environment."[7] But what kind of structural effects?

In the previous chapter, I argued that the exceptional destructivity of nuclear weapons meant that, once invented, new political arrangements were necessary for security in a nuclear-armed world. Absent an international control regime, the only solution for security from nuclear weapons in the 40s seemed to be secrecy over nuclear knowledges – knowledges related to the production or use of nuclear weapons. Nuclear knowledges thus became a security issue. Since no authority can prevent actors from acquiring these destructive weapons, secrecy remained the only solution to prevent the spread of nuclear weapons. Thus, the birth of a "secrecy imperative" stemmed from the intrinsic properties of nuclear weapons. This means that once they had embarked on nuclear research, state officials faced implications of producing

[6] Latour, *Reassembling the Social*, 72.
[7] Craig Parsons, *How to Map Arguments in Political Science* (Oxford ; New York: Oxford University Press, 2007), 62.

those “dangerous” knowledges. They had to react accordingly by resorting to practices of secrecy, which aimed at controlling strictly who got to know what about nuclear research. Perceptions of the security implications of nuclear technology thus forced actors to accept secrecy. Technology constrained actors into maintaining wartime-like measures of information control in peacetime. I argue that the agentic capacity of technology is a necessary condition to explain the outcome, as it was “necessary in the circumstances for the result *as it came about*”. [8]

The agentic capacity of technology, however necessary to explain the outcome, is nevertheless insufficient to fully explain why state actors became convinced that nuclear knowledges should be controlled with utmost care. In some cases, it is clear that officials felt compelled to install control over some knowledges they themselves did not consider to be related to security. Swedish officials, for example, were not overly concerned about the risks of exporting “dual use” technology. Yet, they eventually agreed to implement export control regulations. I argue that they did so because they felt pressured by the world’s new hegemon: the United States. I thus claim that a second constraint that weighed upon the actors, which was not material, but social.

As argued at the end of the previous chapter, the US choice to rely on secrecy to prevent the spread of nuclear weapons logically required to police nuclear research abroad. Indeed, as soon as other actors would start producing nuclear knowledges too, the purpose of secrecy would be voided. So, to prevent this, US actors, particularly from the Department of State, engaged in a campaign to pressure its allies to be more secretive and to control information in a much stricter manner. US hegemony, I argue, is the secondary mechanism that explains the outcome. It does not explain why actors decided to resort to secrecy in nuclear matters, but it explains why they sometimes went beyond what they considered

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[8] John L. Mackie, *The Cement of the Universe: A Study of Causation* (Oxford: Oxford University Press, 2002), 46 (emphasis in the original). I use the term “necessary condition” is a soft way, as a hard necessary conditions imply the material impossibility of certain outcomes absent certain conditions. This would mean that, absent nuclear weapons, there would not have been a form of secrecy over nuclear knowledges. This claim, however plausible, would fail to account for other reasons why state officials would like to resort to secrecy, notably for commercial interests or simply because of unsystematic bureaucratic procedures. For this reason, my argument will limit itself to show that it was *because* of security reasons related to nuclear weapons, actors made the decision to shroud nuclear research in secrecy, and that those security concerns were necessary to explain why the events unfolded as they did. On more demanding forms of necessary conditions, see Bear F. Braumoeller and Gary Goertz, “The Methodology of Necessary Conditions,” *American Journal of Political Science* 44, no. 4 (October 2000): 844–58.

necessary in the name of security. Hegemony, as Mikael Nilsson has argued, is akin to a consented relation, "a relationship in which one consents to the leadership of another because it is beneficial".[9] The US, therefore, did not *impose* secrecy. As John Krige writes, "Hegemony is not a force that is deployed and that determines or dictates outcomes".[10] Rather, allies consented to secrecy reforms because they believed these could be beneficial for them, notably in the prospect of future technological cooperation. This suggests that state officials were more likely to make concessions toward more secrecy in the nuclear domain when under pressure. This was however the case only if they wished to obtain something from the US.[11] Therefore, the development of nuclear secrecy regimes should be linked to diplomatic pressure exerted by the US and/or state officials' desires not to lose their chance at cooperating with the US. It should, however, come second in the explanatory framework. If US hegemony constituted the primary cause of secrecy, this would mean that actors do not react particularly to the structural effects of nuclear weapons.

These two mechanisms only affect the *content* of nuclear policy, only requiring that technical knowledges should be kept secret. These are the minimal boundaries of secrecy. By contrast, the *purpose* of a policy was not of their concern. Officials were free to state that they had chosen to produce nuclear weapons. Yet, they did not. To explain this, one must bring in mechanisms related to domestic politics, and notably, the officials' desire for autonomy. Secrecy over the purpose of policy was a choice: decision-makers sought to avoid potential contestations either domestic or foreign and used the secrecy regime as a way of concealing their choice. By implementing a strong regime of control over information related to the content of their nuclear policy, it was also possible to leave its true purpose unsaid. Though information control is not synonymous with concealment, it offers this possibility too and constraints can turn out handy. This implies that the "secrecy imperative" was not simply a constraint, but it also offered opportunities. Though certain environmental possibilities were closed off, others opened next to

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[9] Mikael Nilsson, *Tools of Hegemony: Military Technology and Swedish-American Security Relations 1945-1962*, (Stockholm: Santérus Academic Press, 2007), 32.
[10] Krige, *American Hegemony and the Postwar Reconstruction of Science in Europe*, 9.
[11] On how US hegemony shaped European states' policies, particularly in the nuclear domain, I refer to the work of John Krige. See Krige, *American Hegemony and the Postwar Reconstruction of Science in Europe*; Krige, *Sharing Knowledge, Shaping Europe*.

them. Therefore, I claim that officials' desire to leave nuclear weapons policy out of the public debate explains why the regimes of secrecy aimed not only at concealing the content of nuclear policy, but also its purpose. Again, this is a claim about the scope of secrecy, not about its original cause. But this means that domestic forces play a role in defining the boundaries of secrecy regimes.[12]

In this section, I have made three claims about the development of nuclear secrecy regimes, hierarchically organized. The first is that secrecy is a product of the causal constraints created by the security implications of nuclear technology. Therefore, secrecy should become imperative to actors as soon as nuclear policy starts to have security implications, that is, when research produced is identified to be related to possible military uses of atomic energy. This constitutes the necessary condition for nuclear secrecy. The second claim is that secrecy is also the product of US hegemony and its effects on state officials' expectations. Therefore, secrecy should, also, become an imperative to actors when they desire to engage in cooperation with the US, and/or when the US has the means to exert pressure over them. Finally, officials' desire for autonomy and the intent to conceal the program from the public eye is also likely to play out. In the following section, I will trace the decision-making process in the UK, Sweden, and France to back my claims with empirical evidence. I emphasize here an important caveat of my analysis which is its important dependency on context. Developing nuclear weapons in the late 40s was very different from today. This is true both in terms of what was publicly available, and thus where the line between what should and should not be secret, was drawn, and in terms of what US policy aimed to do, especially after Atoms for Peace. Therefore, the mechanisms I have identified may not fare as well to explain late comers to the nuclear club.[13]

2. The continuation of wartime politics: the British choice to build the bomb in "utmost secrecy" (1945-1947)

On January 8, 1947, a small group of men from Clement Atlee's cabinet met in London to decide on the future of the British nuclear policy. The idea of a British atomic bomb had been considered for some months already, but no official decision had been taken. Three options were outlined to the few – only

[12] Implicitly, this means that if there had been a strong and powerful social demand for publicity, the boundaries would likely have been different too.
[13] I discuss further in the conclusion the case of India and Israel in regard to this framework.

6 – men present on that day: to pursue a purely peaceful nuclear program and abandon the idea of a British bomb, to pursue a military nuclear program through normal agencies and no particular secrecy, and "to develop the weapon under special arrangements conducive to the utmost secret".[14] Without much debate or opposition, the last option was chosen.

This section traces the process which led to that decision and shows how domestic consideration, particularly the desire to escape criticism about the price of such enterprise, and diplomatic pressure from the United States explain the actors' choice, at least insofar as it concerns the peculiar secrecy required by nuclear weapons. The structural constraints of nuclear technology rapidly affect actors' choice, in part because the UK started its program based on wartime work. Though there were some indecisive months at the end of 1945, when UK officials advocated openness, it was rapidly abandoned, and UK officials turned toward secrecy. The primary concern was security, notably regarding the risk of Soviet espionage. However, the weight of US hegemony was also particularly heavy. This should come as no surprise considering how dependent on the US the UK had become after the war. For these reasons, UK officials advocated secrecy in the nuclear domain. But these do not explain why the purpose of UK's nuclear policy – the fact that it was oriented toward nuclear weapons – remained secret. This, I argue, was a matter of choice: UK officials sought to avoid a costly debate as not all, even inside the cabinet, were on board with the project.

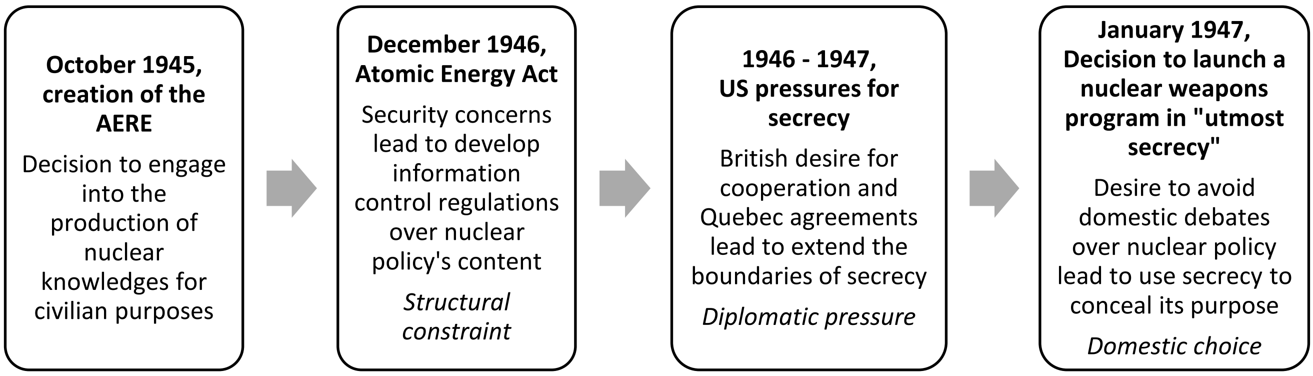

Figure 6 - Secrecy decision-making in the UK (1945 – 1947)

[14] Brian Cathcart, *Test of Greatness: Britain's Struggle for the Atom Bomb* (London: John Murray, 1994), 23.

a. An early secret: Atlee's indecision and the murky months

The politics of British nuclear secrecy, after the end of the war in Europe, were very much a continuation of wartime decisions. Churchill was defeated in the 1945 elections, and Clement Attlee took over as prime minister. It was his cabinet that made most of the decisions which led to the British decision to acquire an atomic arsenal. During the war, Attlee had been kept in the dark about the existence of Tube Alloys, for Churchill did not deem him trustworthy.[15] When he entered power, he did not know, either, that Churchill had approved the use of atomic bombs over Japan, without consulting with his cabinet.[16] Churchill was not particularly talkative about the project: when he approved the appointment of Sir Henry Tizard, in January 1945, at the head of a project to investigate the potentialities of atomic research for the next ten years, he did not give him access to any relevant data. As a result, "the report was obsolete even before it was written".[17]

Decision-making on the British atomic bomb, between 1945 and January 1947, is rather fuzzy and, as noted by historian Brian Cathcart, "no particular events marks its beginning".[18] What is clear is that, from the onset, discussions about atomic energy took place in small circles, and only on three occasion were this topic on the Cabinet agenda in 1945.[19] Churchill had established the precedent, and Attlee followed his path, discussing atomic energy only within the Gen 75 ministerial committee, a group of 8 members and which Attlee called the "Atom bomb committee".[20] This committee, however, never took the decision to build such a bomb. It led to the decision approved by Attlee in October 1945, to create the Atomic Energy Research Establishment (AERE). This new body would carry on Britain's atomic research efforts, notably by building a large-scale atomic pile – an old-fashioned way of naming reactors – for atomic energy research purpose at Harwell, under the authority of the Ministry of Supply (MoS).

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[15] Margaret Gowing, *Independence and Deterrence: Britain and Atomic Energy. 1945-52. Volume I: Policy Making* (London: Palgrave Macmillan, 1974), 5.
[16] Peter Hennessy, *The Secret State: Preparing for the Worst, 1945-2010*, 2nd ed (London ; New York, N.Y: Penguin Books, 2010), xxviii, fn.3. It was Truman who eventually informed Attlee of his predecessor's choice, during the Potsdam Conference. John Bew, *Clement Attlee: The Man Who Made Modern Britain* (Oxford ; New York: Oxford University Press, 2017), 367; Daniel W. B. Lomas, *Intelligence, Security and the Attlee Governments, 1945-51: An Uneasy Relationship?* (Manchester: Manchester University Press, 2017), 151.
[17] Paul, *Nuclear Rivals*, 75.
[18] Cathcart, *Test of Greatness*, 7.
[19] Gowing, *Independence and Deterrence. Vol I.*, 20.
[20] Gowing, 21.

This decision was announced to the public through a planted parliamentary question, which allowed to publicize certain decisions, while limiting the fanfare.[21] The project had been in the mind of the scientists who had taken part of the Manhattan Project for quite some time, and its delay is explained only byt the interruption caused by the election of Attlee. According to Cockroft himself, there existed no doubt that the pile's construction was a measure "to be taken to set up production of U235 and PU239".[22] But as Cathcart notes, "the British public and the international community were not told of the pile's other purpose [plutonium production], which was without doubt its primary purpose".[23] The decision was, rather, presented as part of the broader atomic research project. The fact that the pile would produce plutonium was not a secret, it simply remained unsaid. For anyone with knowledge of the matter, it would have been obvious but, of course, the number of people who would have known remained very small.

Producing plutonium does not equate with a decision to build a bomb. But the decision coincides with efforts to lay out an exploratory phase for a bomb project. In October, an Atomic Weapons subcommittee was established by the Chiefs of Staff to "collect and collate information on the capabilities and limitations of atomic energy when used as a component of a weapon of war" in order to revise the obsolete conclusion of the Tizard report.[24] It would not, entirely, be a secret, but the idea that matters of atomic energy should remain confined to a small number of decision-makers was getting traction. In the 3rd meeting of Gen.75, it was concluded that:

> "The general responsibility for policy on the use of atomic energy would continue to rest with the Prime Minister who would consult from time to time with those of his colleagues principally concerned. The Prime Minister would answer questions in Parliament, but it might in some cases be desirable on security grounds to try to get these removed from the Order Paper".[25]

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[21] Matti Roitto, *Dissenting Visions: The Executive, Parliament and the Problematic Anglo-American Atomic Collaboration in the Changes of British Atomic Foreign Policy 1945-6*, (Jyväskylä: University of Jyväskylä, 2015), 109.; Draft minute for the Prime Minister, November 1945, FO 800/548, TNA.
[22] C. N. Hill, *An Atomic Empire: A Technical History of the Rise and Fall of the British Atomic Energy Programme* (London: Imperial College Press, 2013), 51.
[23] Cathcart, *Test of Greatness*, 14.
[24] Roitto, *Dissenting Visions*, 107.
[25] Note of a meeting of Ministers, "Cabinet – Atomic Energy", Top Secret, GEN 75.3rd Meeting, 3rd October 1945, FO 800/547, TNA.

Already, for Attlee and his advisors, nuclear policy was directly linked to security issues. The mention of "security grounds", in other contexts, could have been interpreted as a fig leaf for less avowable intentions. However, I consider it genuine because it was enunciated in the context of a select committee, whose deliberations were top secret. As such, it cannot be deemed to be a declaration in interest.

Secrecy was far from entrenched at this point. It rapidly drew criticism in Parliament, as exemplified by Albert Blackburn's intervention in which he raised publicly the issue of the lack of information regarding atomic energy and argued that "there is need for far greater information, before this House and the public than is at present available".[26] Blackburn, particularly, sought to inform the public about the nature of atomic weapons but also about the secret agreements between the UK and the US made during the war and kept secret. For some weeks after the end of the war, Attlee had managed – with the complicity of the new leader of the opposition, Winston Churchill – to keep questions on that topic out of the Parliament on the basis that it was "contrary to the national interest".[27] But at the end of October, right after Attlee's announcement about the AERE creation, Blackburn was contesting the implicit deal between Attlee, Churchill, and US policymakers not to publish wartime agreements.[28] It upset Attlee's government so much that Bevin, at the head of the Foreign Office, summoned Blackburn to try to obtain his source.[29] Inside the MoS, some started to come to the realization that "we cannot put a stop indefinitely upon discussions between nuclear physicists in this and other countries".[30] Regarding the press, wartime censorship ended on September 2 1945.[31] This allowed Chapman Pincher to publish an incredibly detailed article on the Hiroshima weapons which included not only a rough design of the bomb, but also told the public that it contained around 150lbs (68 kg) of U235, an astonishingly close

[26] Intervention by Captain Blackburn, UK HC *Hansard*, 30th October 1945, col. 335.
[27] Letter from Atlee to Churchill, 12th October 1945, FO 800/438, TNA.
[28] The reason why neither Attlee nor Churchill wished to saw the agreement published was, alongside concerns that it could lead to the revelation of other secret agreements on raw materials with Brazil, Belgium or Holland, the fact that it contained a clause forbidding the UK from engaging in the commercial exploitation of atomic energy without the US president's agreement, which was an embarrassment. Paul, *Nuclear Rivals*, 79.
[29] Roitto, *Dissenting Visions*, 110.
[30] Letter from D.H.F Rickett to Akers, 9th October 1945, Secret, CAB 126/302, TNA.
[31] Nicholas Wilkinson, *Secrecy and the Media: The Official History of the United Kingdom's D-Notice System* (London: Routledge, 2015), 208.

approximation of the truth.[32] Scientists also remained tepid regarding secrecy. Those who joined Harwell from the Manhattan Project specifically asked that no unnecessary secrecy surround their research. John Cockroft accepted the position of director at Harwell only on the conditions that his scientists would enjoy the greatest freedom in research.[33] Such a demand for openness, however, was explicitly linked to showing the world that the scientists of Harwell were *not* working on atomic bombs.[34] Moreover, it was not a rejection of secrecy, but of unnecessary secrecy – which implies that, to a certain extent, there existed a necessary secrecy.

In March, physicist Alan Nunn May was arrested and sentenced to prison for espionage, having communicated atomic information to the Soviets during the war. The British intelligence services knew by 1946 that the Soviets were engaged in a nuclear program and feared the possibility of espionage.[35] British officials, regarding May, were however less concerned about what he had revealed – he did not have access to the most sensitive part of the Manhattan project – than about how it would make them look in the US eyes.[36]

The following month, the United Kingdom engaged in an Atomic Energy Act of its own, brought to the Parliament at the end of the year. Minutes from an April 1946 Cabinet meeting give reasons to believe that such a bill was motivated by the general evolution of international policy, as it indicates "Must introduce a Bill. U.S & Can. will be legislat[in]g". Without a bill, the UK would be the odd man out.[37] The state of the regulation of nuclear knowledges, at this point, remained unclear – as, in fact, was the case for most war-related technological knowledges. The emergency law giving the state power over

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[32] "75lb, safe + 75lb, safe = ATOM", *The Daily Express*, 28 september 1945, 1. How did Pincher know this exact figure, only a few weeks after the event? Truth be told, he did not. It seems that he was told *the wrong figure* (100kg) and used the Smyth report to draw his diagram of the bomb. However, when sending his copy to the press, a sub-editor, "without reference to anybody", replace the 100kg figure by what he thought would be good approximation in imperial measurements, and wrote the figure of 150lbs, which correspond more to 68kg. By pure luck, the *Daily Express* ended up an almost correct figure of one of the most guarded secret. Letter from Captain Charlie to J.F. Jackson, 9th November 1945, CAB 126/302, TNA.

[33] Gowing, *Independence and Deterrence. Vol II.*, 118.

[34] Memorandum from British Scientists at the Los Alamos Laboratory, New Mexico, 4th October 1945, CAB 126/208, TNA.

[35] See Catherine Haddon, "Union Jacks and Red Stars on Them. UK Intelligence, the Soviet Nuclear Threat and British Nuclear Weapons Policy, 1945-1970" (Doctoral Dissertation, London, Queen Mary University of London, 2008), chap. 1.

[36] Molinaro, "How the Cold War Began ... with British Help: The Gouzenko Affair Revisited."

[37] Minutes from a Cabinet Meeting, 8th April 1946, C.M. 31 (46), CAB 195/4/19, TNA.

the prohibition of the publication of inventions was bound to expire at the end of 1947. At the MoS, some confessed to being "very anxious to get back to peacetime on secrecy", but such a power had been continued "due to the insistence of the Directorate of Atomic Energy".[38]

A seemingly unimportant event gives a good idea of the officials' perception on the topic, and why the Directorate of Atomic Energy was insistent. In October 1946, a couple of journalists asked if it was prohibited to take pictures of Harwell for a story.[39] For Rear Admiral Thomson, the event meant that "the time has come (…) to give a ruling on the degree of secrecy to be imposed on investigations relating to Atomic research".[40] Before this, the problem of secrecy did not really come up because nuclear policy had no materiality. But now, Harwell was operation and it created problems. As Thomson saw it:

> "Officially, we are investigating the possibilities of atomic power for industry – and thus basically these investigations should not, in the press view, be secret. On the other hand, investigation into the possibilities of atomic power for industry and for bomb making seem to me so closely allied that there should be a good case for having secrecy on the whole lot. But any ruling given might have to be justified in Parliament".[41]

The impossibility, at least as perceived by state officials, of separating the two domains was a crucial rationale for imposing special secrecy over nuclear research altogether. As Thomson's interlocutor answered,

> "investigation into atomic energy for industrial purposes is not to be kept secret. But investigations into the application of atomic energy for military purposes must be kept secret and, as the two investigations proceed along the same line for most of the way the need for military secrecy must infect them both. In the present stage practically all technological information concerning atomic energy is of military significance (though it may also be of industrial significance) and must therefore be kept under control."[42]

The reference to the "military significance" of nuclear research directly highlights the officials' concerns about the security implications of nuclear knowledges, and the need for control over their spread. As atomic research began to develop in the UK, the constraint of nuclear technology started to weigh on

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[38] Letter from the Ministry of Supply, "Under Secretary (contracts).", 27th March 1946, AVIA 65/450, TNA.
[39] "Atomic Research Factory, Spingfields, NR Preston (Atomic Energy for Industrial Purposes)", 23rd October 1946, CAB 126/302, TNA.
[40] Letter from Rear Admiral Thomson to Gardiner, 25th October 1946, Private and Confidential, CAB 126/302, TNA.
[41] Letter from Rear Admiral Thomson to Gardiner, *Ibid.*
[42] Letter from F.C. How to Thomson, 13th December 1946, CAB 126/302, TNA.

officials: though they might have wanted more openness, they felt that some degree of secrecy remained required over atomic matters – not all of it, but over that which could have implication for security.

The Atomic Energy Act, and most particularly its section 11, would be passed into law quickly and by a "sparsely attended House of Commons".[43] Scientists, and particularly Rudolf Peierls, had hoped to pressure the Government into a less drastic direction, but their efforts "were almost entirely unsuccessful".[44] For Peierls, the secrecy clause would "prevent free discussion between collaborators" and represented "too high a price to pay for the sake of preventing a fraction of the future discoveries from being made public".[45] They were not heard. The final version of the Bill was even more restrictive than it had been before the debates, as the Government deleted a part of Clause 11 to extend the secrecy regulation to scientific and education purposes regulation. Although the British regulations were not as harsh as their American counterparts and did not create a category similar to the *restricted data*, they still created a state monopoly over any atomic energy related patent and forbade the disclosure of information regarding any atomic energy research or production infrastructure. Basic knowledges, for Attlee, could be made public – as they were, in any case, widely known – but the "know-how" should stay secret.[46]

With this decision, the Attlee government established the basic principle that secrecy should prevail in nuclear issues. I argue that this decision was driven by considerations for the growing implications of nuclear weapons for British security. As the program grew in size, the problem of secrecy, which had remained uncertain in late 1945, was pressing. Even opponents to the Bill recognized that: Peierls, for example, did not advocate full transparency. What was debated, in fact, was only the scope of nuclear secrecy, not the fact that some things should be secret. It is now time to consider the weight of diplomatic concerns, to see how they have, too, affected the officials' thinking.

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[43] Edward A. Shils, "British Atomic Energy Act Debate," *Bulletin of the Atomic Scientists* 3, no. 2 (February 1947): 52.
[44] W. Albert Jr. Noyes, "The British Atomic Energy Act," *Bulletin of the Atomic Scientists* 2, no. 11–12 (December 1946): 9.
[45] Cited in Laucht, *Elemental Germans*, 117–18.
[46] Intervention by the Prime Minister, *UKHC Hansard*, 8th October 1946, col. 47

b. <u>The weight of the "special relationship": US cooperation and the incentive for secrecy</u>

In November 1945, Attlee and Truman met to discuss nuclear cooperation, and the exchange of information. At this point, Anglo-Americano nuclear relations were already on shaky grounds. The Hyde Park memorandum, which had established the basis for cooperation between the two, was not bearing any fruit for the British. Historians debates whether Roosevelt, while signing it, ever had the intention of engaging in long-term collaboration.[47] In any case, by 1945, Roosevelt was dead, and the memorandum was… lost. Secrecy had backfired the British: because the document discussed "Tube Alloys", a filing clerk assumed it was related to naval torpedo tubes and incorrectly filed it.[48] It was recovered only in 1957, although Churchill had kept a copy of it.[49]

The November talks did not go well. British officials sought continued cooperation on atomic matters. However, American internal policy debates were not turning in their favor. As those debates wandered on the terrain of whether or not to maintain secrecy, British officials felt the incentive to be cautious. As discussed in the previous chapter, British and American officials were bound together on the question of secrecy by the Quebec Agreement of 1943 and the Hyde Park Memorandum of 1944. At the end of the war "whether or not the Quebec Agreement ha[d] lapsed with the end of hostilities", remained unclear, raising questions about what scientists at the future AERE could share. In doubt, British officials acted with caution, concluding that "it is to our interest to give the Americans no grounds for saying that action on our part has compromised its validity".[50] The weight of the Quebec Agreement was such that officials from the MoS felt the need to ask the Americans whether they agreed "that British experts should be free to disclose information on atomic energy to the Chiefs of Staff's technical advisers". If they felt compelled to raise such a question it was not merely by courtesy, but because Anderson thought that "it would not be proper for such information to be disclosed until it was clear that there was to be effective co-operation with the Americans in the future".[51] In other words, by October 1945, some high-

[47] Martin Sherwin believed that he did so. Septimus Paul contests this interpretation, questioning why, if he intended to engage in long-term coolbaroation, Roosevelt never initiated any negotiations on that topic. Sherwin, *A World Destroyed*, 113–14; Paul, *Nuclear Rivals*, 67–68.
[48] Cathcart, *Test of Greatness*, 66.
[49] Paul, *Nuclear Rivals*, 68.
[50] Letter from N.M. Butler to the Minister of Supply, 17th October 1945, Top Secret, CAB 126/303, TNA.
[51] Letter from D.H.F Rickett to General Jacobs, 22nd November 1945, CAB 126/303, TNA.

ranking British officials feared that leaks could cost them the promises of cooperation. This even had an impact on the Foreign Secretary thinking about international control of atomic energy, who cautioned against continuing to promote the sharing of "secrets" with Russia as it created the risk that "the hard-boiled U.S War Department, on whom we are largely dependent for continuing to receive information, may decide that we are sold to the Bolsheviks and dry up".[52] This also explains why Attlee was so wary about bringing those matters to the public space.

The end of wartime censorship would prove a challenge in that regard. After Pincher's publication on the Hiroshima weapon mentioned above, damage control was on the agenda. The colonel in charge of Groves' public relations reached out to a diplomat to ask him "if the British security rules on atomic matters in any way approach the American security rules".[53] As a matter of fact, it did not, because on September 14 1945, Truman had requested to American editors not to publish anything related to the "scientific processes, formulas, and mechanics of operations and techniques employed in the operational use of the atomic bomb", as well as uranium stock or plants while, two weeks earlier, the British were putting an end to such censorship.[54] Pincher would repeat the exploit in November 1946, with an article hypothesizing the size of the US arsenal – 96 weapons, based on Hanford production rates.[55] Once again, the British felt immediately compelled to justify Pincher's behavior, and, although "disturbed about the article referred to", felt that no legal action could really be taken.[56]

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[52] Minute by Nevile Butler, "International control of Atomic Energy – Policy Towards the Soviet Government", 18th October 1945, Gen. 96/1, Top Secret, FO 800/547, TNA.
[53] Letter from J.F Jackson (British Supply Council in North America) to D.H.F Rickett, 23rd October 1945, CAB 126/302, TNA.
[54] War Department, Bureau of Public Relations, "Note to Editors", 14th September 1945, Confidential, CAB 126/302, TNA.
[55] Chapman Pincher, "6 bombs made every month", *Daily* Express, 2nd November 1946, 1.
[56] Telegram from the Cabinet Office to Washington, 8th November 1946, CANAM 660, Top Secret, CAB 126/302, TNA. Such anger is striking. For sure, the size of the US arsenal was one of the best kept secret of the period – we still do not know for sure how many people knew its exact size (Ken Young and Warner R. Schilling, *Super Bomb: Organizational Conflict and the Development of the Hydrogen Bomb*, (Ithaca ; London: Cornell University Press, 2019), 157.) – as it was believed that, if the Soviet knew how small it was, it might weight on their calculation in Europe (Wellerstein, *Restricted Data*, 150.). However, as a matter of fact, the US arsenal in March 1947 was in fact way much *smaller* than 96 bombs (David Alan Rosenberg shows that the US possessed, at this point, only 13 nuclear components, and produced in fact less that a bomb every two months. (David Alan Rosenberg, "U.S. Nuclear Stockpile, 1945 to 1950," *Bulletin of the Atomic Scientists* 38, no. 5 (May 1982): 26.) There was no clear rationale for such anger. It seems to confirm the idea that what should be secret about nuclear weapons was not clearly established but, at the same time, it was clearly established that there

The same month, the British Press Association issued a report on uranium deliveries to the United Kingdom. Many precautions were taken to conceal the nature of the deliveries: "Material is described as "mineral ores", consigned to a nominee, and shippers, stevedores, etc. have been told not to talk."[57] But it was not sufficient, and a journalist was able not only to report on those deliveries, but to also specific the exact number of drums and tons. Worse, US radio picked up the report. As written in a telegram from the British embassy in Washington, there was no "need to emphasize the serious result on our relations with the Americans which this grave breach of security will have".[58] The event led, in early 1947, to the issuance of a D-notice on movements of uranium and thorium. Diplomatic and security implications of nuclear secrecy overlapped: if secrecy over uranium deliveries was justified in terms of concerns over US reactions, it must be noted that the rationale for the notice also lay in security officials' belief that knowledge of the stock of uranium could allow to estimate the size of the UK arsenal once it would go into production.[59]

Bounded by its wartime relationship with the US, as well as by the sheer power differential between the two allies, British officials had a serious incentive to adopt measures for secrecy. By the fall of 1946, the United Kingdom had not managed to renew functioning cooperation with the United States, but it remained seriously limited in its secrecy choice by wartime agreements, and its desire to not let go of the "lifeline" that atomic cooperation with the United States could offer even after the McMahon Act. The passing of the Act only seemed to give British security officials more incentive for secrecy in order to meet US expectations and possibly renew cooperation. However, it cannot be said that it was the primary reason for secrecy. Officials did not debate the principle of secrecy over nuclear knowledges on the basis of US expectations, they debated its scope. They believed that some nuclear knowledges could probably be safely published or shared but feared that the hegemon might not share such thought. This was not lost on the public, as exemplified by a May 1947 article in *News Chronicle* in which the

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must be secrets. However, it might also be merely an attempt by Groves to bully the British, which would not be out of character.

[57] Telegram from the Cabinet Offices to Washington, 21st November 1946, Canam 666, Top Secret – Guard, CAB 126/302, TNA

[58] Telegram from Washington to the Cabinet Offices, 20th November 1946, ANCAM 718, Top Secret, CAB 126/302, TNA

[59] Wilkinson, *Secrecy and the Media*, 218–20.

science editor complained "because the Americans would not approve, the British people are not to be allowed to know how their £30.000.000 is being spent at the Harwell Atomic Research and Development Station in Berkshire".[60] This was not an entirely correct statement: while the American pressure was real, it also allowed not to tell the public about the full nature of nuclear activities in the UK, notably the fact that, by May 1947, the British nuclear program had taken a military direction. Secrecy over this particular piece of information, I argue, was a matter of choice.

c. Preventing contestation: choosing secrecy over the program's purpose (January 1947)

By October 1946, as Attlee presented the Atomic Energy Bill in front of the Parliament, the exploratory phase of the British nuclear program was ending. The time had come for a decision. Proposals to build an atomic bomb were presented to an inter-ministerial committee named Gen. 75. Two of its members, Chancellor of the Exchequer Hugh Dalton and President of the Board of Trade, Stafford Cripps, opposed it on economic ground – it would divert resources from the civilian program and hamper the post-war reconstruction of the badly hurt British economy. The rest of the committee, however, were largely in favor of it.[61] It would be the last time the Gen. 75 debated the matter. The issue of nuclear weapons "was taken off the agenda after the meeting". Rather than arguing about it, and risking news of the debate to leak, Attlee decided to form Gen. 163.[62] On January 10th, 1947, it met for its only meeting. What differentiated Gen .75 and Gen. 163 was not its purpose but its size, and hence its confidentiality. The decision to launch a British nuclear program was made by a "nuclear quintet" including the Minister of Supply, the Dominions Secretary, the Minister of Defense, the Lord President, the Foreign Secretary – and, of course, Clément Atlee. Notably absent from the quintet were Dalton and Cripps, the two who had voiced their opposition to the program. The decision was made in secrecy from its opponents.

The six men were presented with three choices: no bomb, a bomb, but no particular secrecy, and a bomb, with special arrangements "conducive to the utmost secret" and camouflaged under the name of Basic

[60] "U.S. imposes research on our atom research", *News Chronicles*, 29th May 1947.
[61] Hennessy, *The Secret State*, 50.
[62] Bew, *Clement Attlee*, 420.

High Explosive Research.[63] The third option was chosen, apparently without much debate. The first was rapidly rejected. All around that table were in favor of the bomb – Attlee had made sure of that. The second was rejected, too, but the very fact that it was presented shows that it was considered a possible choice. It corresponded to secrecy over the content, but not the purpose of the policy. Research would be secret, but no efforts would be made to deceive the public.

It was rejected essentially because the lack of special arrangements for secrecy risked leading to rapid leaks, which could displease the Americans and create more "reticence over technical matters".[64] It was rejected, also, for some of its security implications, because it implied carrying the work at Harwell which seemed risky, as "much of the work will be open to inspection by visiting scientists."[65] Moreover, it was considered useful to keep a research center focused on peaceful research only to avoid the problem of confronting scientists who were not on board with a bomb project.[66] But, more generally, it certainly was rejected because, in the words of one of his biographer, "the way Attlee saw it, any breach of security in these early stages might have threatened Britain's ability to develop a nuclear weapon."[67] To conduct the program in "utmost secrecy" meant that no potential opponents would stand in its way. For Len Scott, it is clear that the decision to conceal the purpose of the program was justified by a wish to avoid confronting the public and certain Labour MPs with the cost of such enterprise, and thus create division.[68] Hence, a handful of British policymakers chose to put the country on the road toward a nuclear weapon, secretly, while ensuring that the conditions for this decision to remain secret were in place.

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[63] According to a memo sent by Lord Portal, with this arrangement, "only five or six seniors officials outside of my own organization [the AERE] need know of this arrangement". Memorandum by the Minister of Supply, "Note by the Controller of Production of Atomic Energy", 31st December 1946, Top Secret, PREM 8/911, TNA.
[64] Cathcart, *Test of Greatness*, 23.
[65] Memo by M.W. Perrin, "Military Application of Atomic Energy", 24 September 1946, cited in Hill, *An Atomic Empire*, 76.
[66] Cathcart, *Test of Greatness*, 22.
[67] Nicklaus Thomas-Symonds, *Attlee: A Life in Politics* (London: I.B. Tauris, 2010), 195.
[68] Len Scott, "Labour and the Bomb: The First 80 Years," *International Affairs* 82, no. 4 (July 2006): 687. It is also Geoffrey Chapman's analysis. See Geoffrey Chapman, "Knowledge Management and Institutional Development within the British Nuclear Weapons Programme, 1947-1993" (Doctoral Dissertation, London, King's College, 2020), 68.

In this section, I have argued that the British secrecy regime developed, first and foremost, out of security concerns: actors faced the security implications of nuclear research and saw secrecy as a way of taming those implications. They reacted to the structural constraint of nuclear technology by resorting to secrecy. They also faced the problems of cooperation with the US and reacted to that constraint as well. British officials did not need the US to become convinced of the importance of secrecy, but the US factor had them go out of their way to ensure secrecy over nuclear policy. These two constraints led British officials to shroud the content of nuclear policy in secrecy. It is difficult to imagine them going in another direction. Having participated in the Manhattan Project, they were acutely aware of the implications of nuclear weapons. As Margaret Gowing wrote in her authoritative history of the British nuclear program, the primary reason for secrecy over nuclear policy in the early years was "awe and fear".[69] One could imagine British officials facing up to the US and abandoning the hopes of cooperation. But even then, they would still have been bound by wartime agreements. Moreover, the prospect of cooperation appeared beneficial to the British. It had a cost, but it came with a reward. Though this second constraint left more room for choice, it still weighed heavily on officials.

The decision to conceal the very existence of the program, however, was entirely up to them. It was, literally, a choice, since officials were presented with other options which they rejected because they did not align with particular policy objectives. This choice was not entirely based on domestic factors: the problem of concealing the program to the US was mentioned too. However, the fact that the decision was taken in a unique committee which, specifically for the occasion, excluded domestic opponents indicated that Attlee sought to conceal the nuclear program for domestic reason. This confirms, I argue, that while secrecy over the content of nuclear policy was a matter of constraint, the concealment of its purpose was a choice. Though the existence of secrecy regimes was the product of external constraints, the definition of its scope remained partly the product of actors' agency.

The British case is clear-cut. Security concerns over nuclear knowledges appeared early on because the British already had some sort of nuclear program by the end of the war. The structural constraints of

[69] Gowing, *Independence and Deterrence. Vol I.*, 56.

nuclear technology were already present. Moreover, British relations with the US were unique: neither France nor Sweden shared such a "special relationship". Craig Parsons argues that a structural explanation requires showing how variations in position in a material landscape led to variations in behaviors.[70] Variations in position toward the constraint of technology seem like a binary – either one has nuclear technology or does not. But I would argue that there are more variations than this: contrary to the British who had been, in some ways, engaged in nuclear weapon research since 1941, one can be at a more primitive stage or lag behind in producing research with any security implications. That would be the case of France or Sweden, who started nuclear research with much delay. These two states were, too, in a different position toward the United States. Therefore, I now turn to the Swedish case to see how structural constraints weighed differently on them.

3. Sweden: from contestation to acceptance of the secrecy imperative (1945-1949)

Sweden's nuclear policy began in late 1945, as the country had not been privy to the Manhattan Project. It learned about the atomic bomb in late July 1945, through the American ambassador interested in gaining control over Swedish uranium reserves. This did not immediately create interest in a Swedish nuclear arsenal. However, it drew the attention of the military which soon launched investigations into the possibility of building some of these weapons. These projects unfolded slowly, and by January 1949, the question of the production of atomic weapons featured on the list of ongoing research at FOA, Sweden's military research organization. This fact was not made public. By January 1949, Swedish nuclear policy also began to be shrouded in secrecy, as regime of personnel control was put in place, and information regarding nuclear energy was severely controlled. This, too, unfolded slowly. Until the beginning of 1947, secrecy was a secondary concern for state officials. Though the military leadership pushed for more secrecy over nuclear research since 1945, it took some time for such a regime to set in. What happened which led Swedish officials to reconsider their stance on secrecy over nuclear policy?

In this section, I argue that it came as a result of two mechanisms. First of all, it was the result of Swedish officials' concern about the security implication of nuclear research. Between 1945 and 1947, nuclear

[70] Parsons, *How to Map Arguments in Political Science*, 63.

research in Sweden was very inchoate, with little output and no specific organization. But in 1947, with the creation of AB Atomenergi, the company in charge of the industrial aspects of the project, this research gained reality, and the now-tangible question of security posed itself anew. Actors felt they had little choice but to use secrecy. This, however, is only part of the explanation: the choices made in 1947 were not particularly decisive or restrictive. Things changed over the course of the year 1948, with the growing interest in military research, and the growing US pressure for more secretive practice. Worried about espionage, and the possibility of losing the chance of cooperating with the US, Swedish officials conceded to more restrictive information control practices. As a result, Swedish nuclear policy became effectively concealed from the public's eyes. This is consistent with my argument according to which technology, first, and diplomacy second, constrain state officials and led to the making of nuclear secrecy regime. However, as will be discussed at the end of the section, the role of domestic factors is harder to establish. Though the military leadership showed no particular interest in going public with the program, it did not seem to be especially concerned about public contestation. It simply did not consider it necessary to go public with their plans. This is an interesting example of how secrecy can be explained almost only as the result of external constraints.

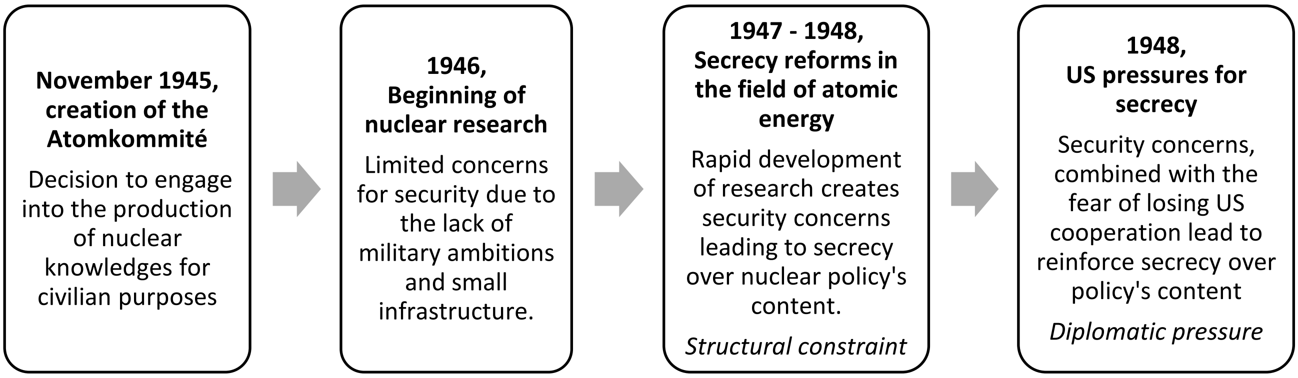

Figure 7 - Secrecy decision-making in Sweden (1945 – 1949)

a. A nascent Swedish nuclear policy: secrecy as a secondary concern (July 1945 – October 1946)

The Swedish experience of the Second World War is incomparable to that of Britain or France. Sweden was not directly involved in the war. It was also kept out of the Manhattan project entirely and was given no information about the atomic bomb's possibility until the end of the war. Military intelligence reported on the possibility of "atomic explosives" as soon as May 1942, but governmental actors were

led to believe that such weapons were impossible in discussions with Sweden's leading physicist Manne Siegbahn in 1943.[71] Sweden did not even try very hard to experiment with fission research during the war.[72] Consequently, the atomic bomb came a surprise for the Swedish public.

Some were more surprised than others. About a week before Hiroshima, some in the Swedish leadership had gained knowledges about the coming event. For some time in June 1945, unbeknownst to the Swedish leadership, Sweden had been the object of an Anglo-American scouting mission to determine whether the uranium in its soil was of interest to Groves' plan for a US monopoly of fissile material.[73] The mission concluded that, contrary to what was originally thought, the Swedish fields of kolm represented an interesting reserve of uranium.[74] Considering this, Sweden's policy of "neutrality", and its proximity to Soviet Russia, British and American officials felt that the Swedish leadership had to be approached.[75] And so on the 27th of July 1945, the Foreign affairs cabinet's secretary Stig Sahlin, met with the US ambassador to Sweden in London to discuss a "top secret" matter.[76] Although instructed not to mention the atomic bomb, the Ambassador clearly spilled the beans, since Sahlin noted in his report to the government that "[the United States] were well on the way to produce 'the atomic bomb'".[77] The matter was discussed between the minister, but only between the Prime minister, and the ministers

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[71] Alf Peterson, "Vad Visste Man i Sverige Om Atombomben Före Den 6 Augusti 1945?," *Polhem* 14 (1996): 250–51. This assessment, as discussed in chapter 1, was not exceptional for scientists unaware of the Meier-Fritsch memorandum, and it was with this idea in mind that Bohr had sailed to the UK. In a conference at Stockholm's Academy of Science in 1943, Otto Hahn had delivered a similar, yet less self-confident, diagnosis to the Swedish audience, doubting "whether it was possible to surmount the technical difficult involved". Rife, *Lise Meitner and the Dawn of the Nuclear Age*, 245.

[72] As noted by physicist and author of a multivolume history of radioprotection Bo Lindell, the Swedish research establishment was unfit for such innovative research as Swedish physics was the work of university lecturers burdened with too many teaching hours and not enough flexibility. Bo Lindell, *The Sword of Damocles. The History of Radiation, Radioactiivty and Radiological Protection. Part 2: The 1940s* (Middletown, DE: Nordic Society for Radiation Protection, 2019), 38.

[73] The mission was made with the assistance of a Swedish geologist but kept secret from Swedish officials. Helmreich, *Gathering Rare Ores*, 60.

[74] The Kolm is a material, similar to oil shale, made of organic matter and rich in uranium fragments found essentially in Sweden. In the 30s, uranium lead extracted from those shales was considered "the purest uranium lead so far found". R. C. Wells and R. E. Stevens, "Further Studies of Kolm," *Journal of the Washington Academy of Sciences* 21, no. 17 (October 19, 1931): 409.

[75] Sir John Anderson, in particular, considered that there existed a risk that, at war's end, the Soviets would cross into Sweden to attack the Germans in Norway and, thus, keep control of part of the Swedish territory, or simply exert pressure of Swedish leadership to force them to deliver uranium. Gunnar Skogmar, "De Nya Malmfälten. Det Svenska Uranet Och Inledningen till Efterkrigstidens Neutralitetspolitik," Arbetsrapport, Forksningprogrammet Sverige under Kalla Kriget (Göteborg: Stasvetenskalipa institutionen, Göteborg Universitet, 1997), 24.

[76] Jonter, *The Key to Nuclear Restraint*, 21.

[77] Stig Sahlin, "P.M", 27th July 1945, Strängt Förtroligt, UD/HP1038, RA, 1.

for Foreign affairs, Defense, Finance, and Trade.[78] A few days later, when the first atomic bomb was dropped on Japan, the ministers and the public realized the actual importance of uranium.[79]

It had an immediate effect on the military leadership. In April 1945, military science in Sweden had undergone an important reform which led to the fusion of various establishments for military research in one organization, named FOA.[80] The reform was not related to the atomic bomb in any way: it had been decided in October 1944 and stemmed from a more general process of reform of military innovation institutions in Sweden.[81] The Military Physics Institute, which was organized by Rolf Sievert during the war, was absorbed into the structure.[82] FOA would become the crucible of the Swedish nuclear weapon program. On the 17th of August 1945, at a meeting of the FOA's board, the atomic bomb made its first appearance, with a demand from the Supreme Commander (*överbefallhavaren*) to put together a report on everything that was known about the atomic bomb. The task was to be fulfilled by Department 2.[83] This should not be mistaken for a decision to build an atomic bomb. The goal of the report was mainly to investigate what this new weapon entailed. As noted by Thomas Jonter, the political leadership was far from being on board with the project at this stage.[84] More generally, investigating the implications of such a massive scientific discovery for Swedish defense was the very purpose of FOA.

FOA was a small organization, with only 150 personnel, and had to rely on cooperation with other institutions, notably the university and the industry.[85] In November 1945, the *Atomkommité* (AK) was created to serve as a civilian governance board for the development of atomic research in Sweden. Made to suit civilian inspirations, it was nevertheless created at the initiative of the military.[86] It was composed

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[78] Skogmar, "De Nya Malmfälten," 38.
[79] It was reported in the press immediately after Hiroshima that Sweden had rich uranium reserves. Stefan Lindström, *Hela nationens tacksamhet: svensk forskningspolitik på atomenergiområdet, 1945-1956* (Stockholm: Statsvetenskapliga institutionen, SU, 1991), 56.
[80] Ann Kathrine Littke and Olle Sundström, eds., *Försvarets Forskningsanstalt: 1945-1995* (Stockholm: Probus : Försvarets forskningsanstalt, 1995).
[81] Kungl. Maj:ts proposition n°293 till riksdagen angående inrättande av försvarets forskningsanstalt, *Riksdagens protokoll*, 20th October 1944.
[82] Lindell, *The Sword of Damocles*, 51.
[83] FOA, Protokoll fört vid sammanträde med styrelsen för Försvarets forskningsantalt den 17 augusti 1945, 17th August 1945, FOA, 001:Ö/A I/1, KA, 4.
[84] Jonter, *The Key to Nuclear Restraint*, 28–29.
[85] Anders Fröman, "Kärnvapenforskning," in *Försvarets Forskningsanstalt: 1945-1995*, ed. Ann Kathrine Littke and Olle Sundström (Stockholm: Probus : Försvarets forskningsanstalt, 1995), 162.
[86] Jonter, *The Key to Nuclear Restraint*, 29.

of members from industry, the military, the government, and academia. Its exact goal was not totally clear. As historian Stefan Lindström remarked, its directive was so vague that neither the production of energy nor military applications was mentioned in it, and it focused essentially on the "exploitation of atomic power".[87] But, for the political leadership, its envisioned orientation was mostly civilian: the discovery of the atom's power raised important hopes for Swedish leaders in their quest for energetic autonomy. This interplay of civilian and military institutions would remain a permanent feature of the Swedish nuclear program, which sought to "accommodate nuclear weapons production in the framework of civilian nuclear energy generation", an idea that was presented as soon as December 1945 and set in for the rest of the nuclear program.[88] Civilian and military nuclear policies were intimately linked. This was also of great importance in the development of secrecy, since civil and military views on the subject were diametrically opposed.

Secrecy had already been an issue in civil-military relations before the beginning of nuclear research. When FOA was created, civilian scientists – notably Rolf Sievert – opposed the military desire for strong secrecy in the institution, arguing that effective research required a certain openness.[89] When the question of secrecy first appeared on the *Atomkommité*'s agenda, on its third meeting in January 1946, its members decided that no particular measures should be taken, "except to leave to personal judgment from case-to-case which kind of secrecy should apply to classified matters". They suggested, notably, that some information should be open to engineers, but restricted from the press.[90] This shows that the general idea of secrecy was accepted already, but as a secondary concern for those in charge of nuclear policy. They perceived the structural constraints as extremely weak for the simple reason that the security implications of Swedish nuclear research were limited: the 1945 report by FOA, which constituted the sum of all Swedish knowledges about nuclear weapons was, to a large extent, a summary

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[87] Lindström, *Hela nationens tacksamhet*, 57.
[88] This is particularly important notably because, as Jonter has shown, this also determined the fate of the program, by creating much more problems than it solved. Jonter, *The Key to Nuclear Restraint*, 44.
[89] P.M till Konungen, 31st January 1944, FOA Arkiv, Ö V:1, RA.
[90] Atomkommitén, Protokoll nr 3 vid sammanträde med atomkomittén, 4th January 1946, AK Arkiv, A I a:1, RA, 3.

of the public Smyth report.[91] Secrecy would appear twice again on the committee's agenda, in mid-January and in September, but only to be rescheduled to later meetings.[92]

The military had a greater interest for secrecy. In March 1946, the Committee was adding the finishing touches to its first report which was supposed to be entirely public. Before its publication, the Chief of the Defence Staff, C.A Ehrendsvärd, tried to change this, and went to the Defense Minister to ask for parts of it to be classified. His rationale was that the basic physics data could be published, but not the parts related to the organization, or the personnel required should be classified. For Enhrendsvärd such information, if made public, could unnecessarily help intelligence services to either spy on or sabotage Swedish research.[93] The same request was conveyed to the head of the *Atomkommité*.[94] It was not heard: the report was published in its entirety.

On two occasion, in April and June 1946, his superior, the Supreme Commander, requested that the government take measures regarding the protection of atomic energy research.[95] The military was forced to turn to the government because the dispersion of nuclear research between several actors, many of them civilian, limited the military's authority over the field.[96] Its renewed interest in secrecy can also be linked to the fact that, in March 1946, FOA had filed a secret application grant which described atomic bomb research as an" urgent research task" given "high priority".[97] In May, the first atomic bomb study commissioned by FOA was completed, and studies were carried out to determine the feasibility of uranium extraction.[98] But classifying research related to atomic energy seemed to be an issue only for the military: in early 1946, the Justice Department was preparing a bill to regulate the status of military invention and organize the regulation of knowledges in that field. A law had been passed in 1942 but

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[91] *FOA och kärnvapen: dokumentation från seminarium 16 november 1993* (Stockholm: FOA veteranfören., 1995), 10.
[92] Atomkommitén, Protokoll nr 4 vid sammanträde med atomkomittén, 18th January 1946, and Protokoll nr 13 vid sammanträde med atomkomittén, 13th September 1946, AK Arkiv, A I a:1, RA.
[93] Letter from C.H. Enhrendsvärd to the Minister of Defense, 27th March 1946, Hemlig, FOA Arkiv, F I:1-2, RA.
[94] Letter from Lt. T. Schmidt to Gösta Funke, 16th March 1946, FOA Arkiv, F II:1, RA.
[95] Atomkommitén, PM betr. Atomenergilagstiftning, 16th November 1950, Hemlig, FOA Arkiv, Ö 4:2, RA.
[96] FOA, Protokoll fört vid sammanträde med styrelsen för försvarets forskningsantalt, 12th June 1946, FOA Arkiv, Ö A I:1, RA, 4.
[97] Lindström, *Hela nationens tacksamhet*, 55.
[98] Jonter, *The Key to Nuclear Restraint*, 44–45.

had been temporary and was about to lapse.[99] In the bill's preliminary report, there was no mention of atomic energy. It is not clear whether it was an omission from the Justice Department, or a principled stand against covering atomic energy research in a military-related bill. In any case, few seemed to have considered the issue to be urging. It would be only after an explicit request by FOA that "discoveries regarding the use of atomic energy for military purposes" became covered by the bill.[100]

In October 1946, the bill passed into law. Its first article, which disposed that any invention of military importance should be kept secret, did not mention atomic energy at all.[101] Yet this was explicitly discussed when presented to Parliament. The Ministry of Defense underlined that any discovery related to the liberation of atomic energy should be kept secret, "regardless of whether [it] had a direct relevance as a weapon", an interpretation with which the Academy for Engineering Science concurred, as it seemed impossible to differentiate between civilian and military uses of atomic energy. In doubt, everything should be subjected to secrecy.[102] The Department of Justice agreed, too, arguing that "under the current state of international relations", any discovery of that sort was of great interest.[103] In the parliament, it seems that only one man, Georg Branting, publicly expressed doubts at this idea.[104]

This bill presents several interesting aspects. First, it shows a consensus over the necessity of secrecy when it comes to atomic energy, and a lack of clear justification for it, besides the mention of the interconnection between civil and military purposes – a justification put forward by the British as well. Nuclear knowledges, by nature, were *dangerous* and should be treated as such. It was not an object of debate. Moreover, they might also be *precious* and of value as a currency, as indicated by the Department of Justice idea that secrecy was justified by the "interest" of the invention. In any case, at this point, the McMahon Act had passed, and few alternatives to secrecy could be imagined. Second, and nuancing the

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99 Statens offentliga utredningar, *Betänkande med förslag till lag med särskilda Restämmelser om uppfinningar m.m. av betydelse för Rikets försvar*, 1946 (SOU 1946:25), 11

100 FOA, Protokoll fört vid sammanträde med styrelsen för försvarets forskningsantalt, 17th April 1946, FOA Arkiv, Ö A I:1, RA, 1.

101 Lag n°722 med särskilda bestämmelser örn uppfinningar av betydelse för försvaret, 29 November 1946, §1.

102 Annex to the Riksdag's protocol, "Kungl. Maj:ts proposition till riksdagen med förslag till lag med särskilda bestämmelser örn uppfinningar av betydelse för försvaret", 4 October 1946, n°342, 20-21

103 *Ibid.*, 30.

104 Intervention of Georg Branting, *Riksdagen Protokoll,* Första Kammaren, 19 November 1946, n°37, 39-40. Ironically, Branting would turn out to be a source for Soviet intelligence, under the code name of "Senator"… Wilhelm Agrell, *Venona: spåren från ett underrättelsekrig* (Lund: Historiska Media, 2003), 271.

first point, that atomic energy research should be submitted to a *special* kind of secrecy, however, was not established. The bill only put inventions related to nuclear energy in the same category as other military materials. It did not cover research, but only research results, and even most specifically, it covered *inventions*. In this sense, it was still grounded in pre-war conceptions of nuclear secrecy and similar to France's 1940 decision.[105]

Regarding research itself, secrecy was still rejected, as evidenced by the debates inside the *Atomkommitté* which took place around the same time as the law was discussed. During the debates, members discussed a bill proposed by the Supreme Commander, suggesting a need for more secrecy regarding atomic energy policy and research. The proposal was severely criticized and eventually rejected by the committee. Interestingly, one of its opponents, The Svedberg, argued that such bill would have "catastrophic effects" on the relations between the US and Sweden. His worries are not justified in the minutes. It is possible to hypothesize that Svedberg considered that secrecy would look suspicious in the US eyes and indicate military intent.[106] During the first year of nuclear research in Sweden, the question of secrecy was largely a secondary concern. I argue that it was because the structural constraint of nuclear technology was of very little effect since Sweden did not, in fact, have much of a nuclear program. Actors agreed that atomic matters deserved to be treated with caution but none outside the military seemed ready to take particular measures to ensure secrecy. Things would begin to change in 1947, however, as pressure grew stronger, and secrecy became more imperative.

b. Accommodating technology and the US: Sweden's acceptance of nuclear secrecy (October 1946 – December 1948)

If the scope of secrecy was pretty much undetermined in late 1946, by July 1947, the Swedish government had taken its first step toward the organization of secrecy over nuclear research. This tentative step was then reinforced the next year and by early 1949, one can speak of an established decision to shroud nuclear research in strict secrecy, in the form of a specific regime of personal control

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[105] See Chapter 2, 1.b.

[106] Indeed, in the same meeting, he advocated for a separation, as large as possible, between FOA and atomic energy policies as it could lead the US to refuse Sweden all forms of cooperation if atomic policy appeared to be a military matter. Atomkommitén, Protokoll nr 14 vid sammanträde med atomkomittén, 14th October 1946, AK Arkiv, A I a:1, RA, 1.

and the classification of some aspects of the research. In this subsection, I argue that this was the result of three factors. The first is contextual: the 1947-1948 period is one during which the fear of Soviet intrusion in Swedish affairs grew, and the fear of communists began to take hold within the Swedish security state.[107] In 1948, an important reform of espionage laws was passed.[108] The problem of secrecy seemed more urgent in such a context. However, most importantly, 1947-1948 is also the period during which Swedish nuclear research started to materialize. The inchoate organization of 1945-1946 was replaced by a different one, and research was taking place on a larger scale. For this reason, the security implications of nuclear knowledges became inescapable, and the problem of secrecy appeared much more clearly. The indistinct nature of the Swedish program, with its strong overlap between civilian and military research only reinforced the problem of distinguishing between what could be public, and what could not. Finally, during this period, the US pressure over Sweden increased, forcing Swedish officials to abide by this pressure and show Sweden's ability to keep nuclear secrets.

During the period 1945-1946, although research was taking place at FOA, nuclear research was organized in a very networked manner, with some tasks being given to certain researchers in universities or in the industry. Research lacked a proper organization, as the *Atomkommitté* was no more than a mere governance institution. The committee's first report concluded that the construction of a first reactor and the training of Swedish researchers and technician should be the first step toward significant nuclear development.[109] Such a task would require a certain organization, which the committee set out to design in October 1946. Its debates led to the creation of AB Atomenergi, a government-controlled company in charge of the industrial exploitation of nuclear energy in March 1947. As a large budget was granted to FOA for the fiscal year 196/1947, military activities in the nuclear field were intensifying and

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107 Magnus Hjort, "Folk Och Försvar Och Kampen Mot Den Femte Kolonnen: En Studie i Framväxten Av Övervaknings-Sverige under 1950-Talet," Arbetsrapport, Forskningsprogrammet Sverige under Kalla Kriget (Göteborg: Statsvetenskapliga institutionen, Göteborgs Universitet, 1998), 17–18.

108 *Spioneri och annan olovlig underrättelseverksamhet: ett förstärkt skydd för Sveriges säkerhet; betänkande av Utredningen om förstärkt skydd mot främmande makts underrättelseverksamhet*, Statens offentliga utredningar, 2012,95 (Stockholm: Elanders Sverige, 2012), 81–84.

109 ”Referat av atomkimmiténs betänkande – Föredrag av lekor Gösta Funke", undated, FOA Arkiv, Ö IV c:1, KA, 1.

expanding too. A special FOA section was created to study the process of plutonium production.[110] With the creation of such an organization, secrecy take a different scale, since the number of participants would be larger. As noted by Torsten Gustafson, physicist and advisor to Prime Minister Erlander, nuclear policy and research had mainly been the problem of a small number of men inside the *Atomkommité*. With the beginning of the work on uranium and on the pile, far more workers would be needed and all of that had to be sufficiently discrete. Gustafson remained opposed to the use of classified documents.[111] Later, the participation of shareholders in AB Atomenergi's capital raised concerns about the possibility that this would jeopardize secrecy.[112] The fact that these questions about secrecy were raised precisely when nuclear research was beginning to take a material shape is evidence that the problem, so far, had been avoided only because there was not much to be secret about. But now that the Swedish program was being implemented into policy, the question of controlling information was more pressing. This had been the argument of FOA: secrecy was necessary, maybe not now, but in the future because there would come a time when "dangerous" and "safe" knowledges would be indistinguishable.[113] Now the time had come, and the rudimentary system based on personal judgment was not fit for purpose anymore. Moreover, fears of espionage were growing, and atomic energy was identified as a field of peculiar interest for Soviet spies by Swedish security services fearing a "fifth column".[114]

Swedish nuclear officials could not escape the security implications of nuclear knowledges anymore. On May 23rd, 1947, the decision was made to take measures regarding the "protection of atomic energy research". It was decided that such research should be the object of particular protection, that rules should be established about what could, and could not be made public, and that foreigners should be

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110 Swedish scientists, indeed, had concluded early on that plutonium was the best way forward for a nuclear weapon program. Jonter, *The Key to Nuclear Restraint*, 46.
111 Atomkommitén, Protokoll nr 17 vid sammanträde med atomkomittén, 14th January 1947, AK Arkiv, A I a:1, RA, 15.
112 Atomkommitén, Protokoll nr 20 vid sammanträde med atomkomittén, 27th March 1947, AK Arkiv, A I a:1, RA, 13.
113 Atomkommitén, Protokoll nr 14 vid sammanträde med atomkomittén, *Op. Cit.*, 1.
114 "Kungl. Civilförsvarsstyrelsens anvisningar för lämnade av uppgifter angående personal som är änstalld eller avses skola anstållas för sådan verksamhet rörande den målbundna atomenergiforskningen, som iche må offentligöras", Tillhör Dnr 3 HDB/1947, Hemlig, CFS Arkiv, B IIIc:1, RA.

prevented from working in this field unless specially authorized.[115] These rules aimed first at preventing outsiders from knowing "how far Sweden had come in the field of atomic energy". Though the Atomkommité would be in charge of establishing those rules, it could do so only in cooperation with the Chef of Defense staff.[116] With the May 23 order, information control started to come together, and nuclear policy began to be shrouded in secrecy. All of it: no clear distinction was made between military and civilian research. Secrecy would be a joint policy. However, it seemed understood that military research deserved more secrecy that civilian ones. When AB Atomenergi and FOA began cooperating, in 1948, their agreement stipulated that the two organs would exchange information, but that FOA would only send pieces of information which did not compromise military secrecy.[117]

Secrecy imposed itself over Swedish policymakers in some sense. Though officials had managed to postpone the problem, once their environment was materially transformed by the advance in nuclear research, they could not ignore the security constraints created by nuclear knowledges. Before that, the question of espionage seemed very secondary, as there was little to spy on. But with the large-scale development of nuclear research in Sweden, secrecy became imperative. It could be, of course, that actors simply had changed their minds for reasons unrelated to these material-technological constraints. But this would mean that all actors did so at the same time, since after May 1947, the *Atomkommité*'s protocols record no contestation regarding secrecy. Moreover, though secrecy was contested in the earlier period, what was contested was not its necessity, but its organization on a very personalistic way. With the creation of a large-scale structure such as AB Atomenergi, and the development of research at FOA, case-by-case regulation were no longer sufficient.

However, to summarize the origins of the Swedish nuclear secrecy regime as a mere security problem would be an oversimplification. The 1947-1948 period was also a period of growing diplomatic pressure on Sweden, criticized by US diplomats for being insufficiently secretive and much too naïve. Not aggravating the United States was an important concern for Sweden. Even though it did not opposed

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[115] Brev till Atomkommitté, 23 May 1947, Dnr 47:184 H, Hemlig, CFS Arkiv, B IIIc:1, RA.
[116] PM angående sådana sakförhållanden inom den målbundna atomenergiforskningen, som med hänsyn till rikets försva icka böra offentliggöras, 1947, Hemlig, CFS Arkiv, BIIIc:1, RA.
[117] Jonter, *The Key to Nuclear Restraint*, 55.

alliances and did not seek to join NATO, Sweden was afraid of a possible isolation from the US which could affect trade and military imports.[118] Regarding nuclear policy specifically, this meant that they feared being cut off from US technological assistance. When lobbying for the importance of secrecy in March 1946, the Chief of the Defense Staff put forth another argument than the risk of enemy action: the risk of ally abstention. As he put it, there existed a risk that, if Sweden was not cautious enough with nuclear knowledges, it would be barred from information exchanges with other countries.[119]

Sweden, unlike the UK, was not bound by any treaty with the US which would have allowed Washington to exert direct pressure. However, it was not impervious to the effects of US foreign policy. From 1945, Sweden had been of interest to the US for its uranium reserve which it sought to control. Already then, the US leadership had worries about “their form of government” which “restricts freedom to make security-cloaked governmental agreements”.[120] Sweden was not of interest to the US only for its uranium resources: it was both “an important center for atomic energy intelligence”, and one of the rare exporters of “industrial equipment suitable for atomic energy applications”.[121] The Swedish scientists accomplishments were a concern for the Department of State as, according to the US ambassador to Sweden, “the Swedes were fairly good security risks”, not out of any ill intent, but rather because of “their naïveté”.[122] Hence the question asked on the Secretary of state’s behalf to the Swedish ministry for foreign affairs in 1948: “Are Swedish technological secrets adequately guarded?”.[123]

To ensure that Sweden would grow out of its pre-nuclear “naïveté”, US policymakers relied on the tools of export control. As John Krige and Mario Daniels recently showed, the post-war period gave rise to a permanent US export control regime, which spanned over several domain of the industry, far beyond

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[118] Jonter, “Ett Tänkbar Tolkningsgram För Svensk-Amerikanska Studier under Kalla Kriget,” 36–37.
[119] Agrell, *Svenska Förintelsevapen*, 54.
[120] Memorandum by Major Harry S. Traynor, on the Staff of the Commanding General’, Manhattan Engineer District (Groves), [Washington] August 3, 1945, FRUS, 1945, Political and Economic Matters, vol. II, 30
[121] Letter from the Under Secretary of State (Lovett) to the Ambassador in Sweden (Matthews), Washington, July 2, 1948, Top Secret, FRUS, 1948, The United Nations, vol. 1, 716-718.
[122] Memorandum of Conversation, by Mr. David H. McKillop of the Office of the Under Secretary of State (Webb), Subject: Meeting with H. Freeman Matthews, U.S. Ambassador to Sweden. [Washington,] May 3, 1949. Top Secret, FRUS, 1949, National Security Affairs: Foreign Economic Policy, vol. I, 470.
[123] The Swedish answer was a mere “Yes.” Aide-memoire from the US embassy in Stockholm, 13th September 1948, Top Secret, Dep 20K, HP1039, RA.; The Secretary of State to the Embassy in Sweden, Washington, August 30, 1948—4 p. m, Top Secret, FRUS, 1948, The United Nations, vol. 1, 750.

the nuclear field.[124] Through export control, US policymakers sought to control the industry, and prevent it from selling technologies deemed sensitive to the Soviets. At the heart of the export control regime was not so much the physical objects, but the "control of intangible knowledge and know-how" embedded into those objects.[125] Originally, Sweden was not directly affected by US export control policies, as only a small number of dual-use instruments were imported from the United States.[126] Yet, Swedish firms were exporting technologies to the Soviet bloc. For example, in March 1946, a Swedish firm concluded a contract with a Czechoslovak firm for the sale of ceramic kiln of a kind "easily convertible to production of a type of porcelain peculiarly suited to atomic energy development". Unable to act upon this situation, the State Department reached out to the Swedish Ministry for Foreign Affairs hoping that it may be possible for them "to take effective action to prevent the execution of the contract".[127] In May 1947, the AEC also started to express worries, too, upon noticing that some Swedish firms were able to produce advanced equipment, but that no real export-control regime existed and that Sweden did not classify all information related to atomic energy. As a consequence, it even decided to stop all atomic related exports to Sweden in the spring of 1948.[128] All this must not be taken at face value but understood in a context where the US foreign policy aimed at both discouraging Sweden from exploiting its uranium and preventing a Swedish nuclear acquisition.[129]

These methods of increasing pressure had effects. By 1948, Swedish policymakers started to respond to American pressure and incentives for a tighter control over its exports related to atomic energy. They considered leveraging Sweden's uranium production to "obtain valuable information for the reactor construction from other countries".[130] Bad timing: the summer of 1948 was also the moment when US planners were losing interest in Swedish uranium.[131] Sweden's relative position toward the US was evolving in its disfavor. At the same time, Swedish laboratories started to import laboratory equipment

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[124] See Daniels and Krige, *Knowledge Regulation and National Security in Postwar America*.
[125] Daniels and Krige, 11.
[126] Aide-memoire, 6th October 1948, HP1039, RA.
[127] Aide-Memoire from the US embassy in Stockholm, 18th March 1946, Top Secret, 170/105, HP1039, RA.
[128] Thomas Jonter, "Sverige, USA Och Kärnenergin. Framväxten Av En Svensk Kärnämneskontroll 1945-1995," SKI Report (Stockholm: Statens kärnkraftinspektion, May 1999), 16.
[129] Jonter, "The Swedish Plans to Acquire Nuclear Weapons, 1945–1968," 66.
[130] Letter from T. Schmidt to Nils Swedlund, 20 May 1948, Dnr 48:123 a h, Hemlig, FOA Arkiv, Ö 4/2, RA.
[131] Skogmar, "De Nya Malmfälten," 86.

from the United States, which made the matter more urgent and Swedish officials launched an investigation inside the Swedish Trade Department.[132] The existing Swedish legal framework, established in 1930, did not consider the possibility of preventing the export of “dual use” technology, a concept foreign to the Swedes, which had emerged as the result of internal US debates. But, as a Swedish diplomat suggested, “in consideration of its importance in the perspective of the Kingdom’s relations with foreign powers”, such control should now be extended to materials related to atomic energy too.[133] In the meantime, Sweden agreed to stop the export of atomic energy material from the United States,[134] and decided to classify as secret a number of patents concerning methods for the production of uranium from low-content ores, in spite of legal difficulties regarding ownership.[135] This seemed to satisfy the Under Secretary of State, who noted in June 1948 that “we have had several specific cases where the Swedes, at our request, have denied export licenses of atomic energy equipment to Curtain areas.”[136] In July, the AEC re-authorized exports to Sweden, switching its stance from an out and out refusal to a “end of the line formula”.[137]

To ensure some relative oversight of Swedish exports, by late 1948, a “technical attaché” joined the American embassy in Stockholm. A nuclear physicist who had been trained at Lund University, Howard Robinson was presented as a mere “councilor”, who presence was related to the importation of radioactive isotopes to Sweden.[138] For the Swedish ministry for foreign affairs, however, the new technical attaché resembled the infamous “customs attachés” and was convinced that the new “atomic energy attaché’s” main task would rather be to “oversee the Swedish exports that some consider important” in the atomic field.[139] This pressure, I argue, also explain why Swedish officials decided to

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[132] Unsigned letter from the 1st of June 1948, HP1039, RA.
[133] Letter from Sven Grafström to the head of the Trade Department, “ang. kontroll över utförsel från riket av utrustning för atomkraft m.m”, 5th June 1948, Hemlig, HP1039, RA.
[134] Letter from Holmgren to the Minister of foreign affairs, 28 July 1948, HP1039, RA.
[135] Indeed, when a firm listed a patent as secret, the question of who owns the discovery, and how the inventor is redeemed, is unclear. Sweden’s decision to classify findings related to uranium mining technics as secret preceded the existence of any system of compensation. *Verkställande direktörena redogörelse för verksamheten inom Aktiebolaget Atomenergi under år 1949*, HP1039, RA.
[136] The Under Secretary of State (Lovett) to the Administrator of the Economic Cooperation Administration (Hoffman), Washington, June 28, 1948. Top Secret, FRUS, 1948, General: The United Nations, vol. 1, 716
[137] Jonter, “Sverige, USA Och Kärnenergin,” 16.
[138] P.M for the Ministry of Foreign affairs, 4th March 1949, Förtrolig, HP1039, RA.
[139] It was, indeed, precisely why he was there. P.M for the Ministry for Foreign Affairs, 29th September 1948, HP1039, RA.

shroud their nuclear policy in secrecy. As in the British case, it only comes into play as a secondary mechanism. Yet, it was important. In a memo dated 31st of December 1948, the head of the Civil Defense directory, which ended up being in charge of personnel control, signed a lengthy memo highlighting existing problems with the nuclear secrecy regime, which he believed to be too restrictive. Notably, he argued that many more laboratories than was already the case should be the object of secrecy, especially those using cyclotrons. If the United States knew how bad Sweden's secrecy regulations were, he argued, the relations between the two countries would only get worse.[140] For this reason, he proposed a reform to strengthen the security measures around atomic research and reinforce personnel control. The proposal was accepted by the Atomkommitté in February 1949.[141] After that, information control hardened, and Swedish nuclear policy became shrouded in even more secrecy.

c. Going gently into the night: secrecy as a by-product of information control

By early 1949, the production of nuclear weapons was on FOA's agenda. The Swedish military nuclear program was on track. Two major decisions had been made a year earlier. The first was the decision to orient the work of FOA's first section toward the protection against atomic weapons, a task which implied the pursuit of advanced studies on nuclear weapons, albeit for protection purpose only.[142] The second was the decision made on the 16th of February by the Chief of Defense Staff, and future Supreme Commander, Nils Swedlund, to commission a FOA study on the use of nuclear energy for military purpose.[143] The study was concluded in May. For historian Wilhem Agrell, it is almost a "sketch for a Swedish Manhattan project", both in terms of steps to be taken, and in terms of budget.[144] The Swedish plans were taking shape, and a repartition of the work was drafted, between FOA which should focus on design and chemistry problems with plutonium, and AE which would concern itself with the industrial production. In early 1949, a memo defined the program for future FOA studies on "atomic

[140] Chef för Civilförsvarsstyrelsen, "PM rörande visa frågor, som sammanhänga med skyddet av atomenergiforskningen", 31st December 1948, Hemlig, CSF Arkiv, E IIIb:1, RA.
[141] Bilaga till protokoll vid sammanträde i atomkommitén 9 february 1949, 9th February 1949, Hemlig, AK Arkiv, A I a:12, RA.
[142] FOA, Protokoll fört vid sammanträde med styrelsen för försvarets forskningsantalt den 11 februari 1948, 11th February 1948, FOA Arkiv, Ö A I:1, RA, 1.
[143] Agrell, *Svenska Förintelsevapen*, 71; Jonter, *The Key to Nuclear Restraint*, 57.
[144] Agrell, *Svenska Förintelsevapen*, 73.

energy research for the Defense purpose": determine whether Sweden could aim to produce atomic weapons, or if it should rather focus on protection research. Consequently, it should engage on studies on "atomic bombs construction", including the calculation of critical mass and efficiency rate of atomic weapons and the study.[145]

None of this was made public. It was not truly concealed either in the sense that there was no clear intent at deception, unlike in France and the UK. While the military could conceal its plans thanks to secrecy regimes, the project was only a secret for the general public, not for relevant state officials. The *Atomkommité* was aware of the 1948 study on nuclear weapons, and some of its members, like industry leader Ragnar Liljeblads, could criticize it, pointing out that FOA seemed to underestimate the difficulties of the whole enterprise.[146] As Thomas Jonter notes, some members of the government, for their part, received the grant applications from FOA, and was able to approve, or refuse them. It did the latter for the years 1950/1951 – not as an opposition to the program but merely as a way of preventing FOA from growing larger than its intended purpose required.[147] These grant application, however, were secret, and the bills on which the parliament voted did not mention atomic research specifically. But I have found, in the archives, no clear intention of deception in that regard[148]: these were simply things now meant to stay secret. Secrecy over the purpose of the program was primarily a by-product of secrecy over its content.

This section has argued that when engaging in a nuclear weapon program, Swedish officials seemed to have seen few choices other than to resort to secrecy to ensure, first, security from espionage which could have led to vulnerabilities in front of the Soviet neighbor. If secrecy became a concern later on

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145 FOA, P.M. angående målsättning för atomergiforksning för försvarets räkning, Dnr H 1022-8509, Hemlig, FOA Arkiv, Ö 4:2, RA.
146 P.M betr. FOA:s utredning av betingelserna för framställning av atombomber, radioaktiva stridsmedel of andra former av atomenergi i Sverige, Hemlig, FOA Arkiv, Ö 4:2, RA.
147 Jonter, *The Key to Nuclear Restraint*, 61.
148 This conclusion is drawn from the reading of the entirety of the *Atomkommité*'s deliberation over the relevant period, as well as many of FOA's papers. Absence of evidence is not necessarily evidence of absence. I however find the claim plausible because, first of all, these deliberations were kept secret, meaning that actors could more freely express the truth of their opinion. Moreover, I have found no evidence that the *Atomkommité*'s archives were sanitized. Had the actors a clear intention of carrying out a policy of deception like the UK did, it is highly likely that reference to it would have appeared, or that the number of documents sanitized would be significant enough that one could pick up on it. I therefore consider my claim plausible.

for Swedish, it is because the problem of the security implications of nuclear technology came later for historical reasons: Sweden did not have an organized infrastructure oriented toward nuclear research until mid-1947 and did not consider nuclear weapons one of its tasks until mid-1948. Therefore, actors did not have to react to the structural constraints of nuclear technology as early as their British counterparts. Second, the possibility of a future cooperation with the US also guided decision-making. The US constraint was secondary: it played a role in actors' decision making but over marginal concerns. This is not surprising, as it derives from the variations in Sweden position toward the US. It expected less from them, and the US had fewer way of influencing their policy.

This regime established control only over the *content* of the policy. Swedish officials did not have the clear intention to hide to the public the fact that they were engaged toward weapon production. While they did not wish to be upfront about it, either, but unlike the UK or France, did not make concealing the policy's purpose from the public the main goal of secrecy. But, in a context where only a handful of actors could access the relevant information necessary to draw conclusion about the policy's purpose. Unlike France or the UK, it must be noted that when Sweden engaged toward nuclear weapons research in 1949, it was far from having a large infrastructure and did not intend to build a bomb anytime soon. The requirements of secrecy were different. Had Sweden engaged in large-scale research all at once, perhaps it would have been confronted with the problem of informing or deceiving the public. This nevertheless confirms that nuclear secrecy regimes were less the product of state actors' agency than the result of constraints bearing upon them. The Swedish decision to engage in nuclear research made other outcomes unlikely. However, it must be noted that the indistinction between civilian and military secrecy – or, rather, the limited distinction – was unique: it was the product of the indistinction between the weapon and the energy program and of the continuous cooperation between military, civilian and industrial actors in the field of atomic energy which was very specific to the Swedish program.

4. France's reluctant choice: from minimal secrecy to clandestine research (1945-1954)

In this last section, I come to the case of France that presents a challenge to my framework as, until quite late, French officials from the CEA did not seem particularly concerned about secrecy. Though they applied certain rules for information control over nuclear research, the problem of secrecy was very

much secondary for them until quite late – until, in fact, they started considering acquiring nuclear weapons in the early 50s. Why did French officials managed to escape the structural constraints of technology for so long? The answer could be that, like the Swedish, French officials reacted to that constraint later because their research was not developed enough to have security implications. But, in fact, France was rapidly much more advanced than Sweden. Nuclear research started in France in 1945, and its first reactor, ZOE, diverged in 1948. However, for some times, French officials from the CEA managed to resist the structural constraints by drawing a clear distinction between research with, and without security implications. They fully admitted that some knowledges had security implications and should be secured but, simply, they considered that they were not producing any.

However, as soon as decisions toward a nuclear *weapon* program were taken, the imperatives of secrecy set in and, by 1954, a nuclear secrecy regime started to be built. From an institution with a minimal secrecy policy, the CEA became the host of a clandestine research program. How did that happen? In this section, I argue that the relative openness of the "first CEA" was due to the absence of any military research and, hence, a relatively weak structural constraint. Once this status became more ambiguous, French leaders were eager to resort to secrecy. Unlike nuclear scientists, many, especially in the military, were convinced that nuclear knowledges should be kept secret. This was not only a matter of security. As shown here, it was also a way of concealing an intent to militarize French nuclear research against the will of its scientists and the country's public.

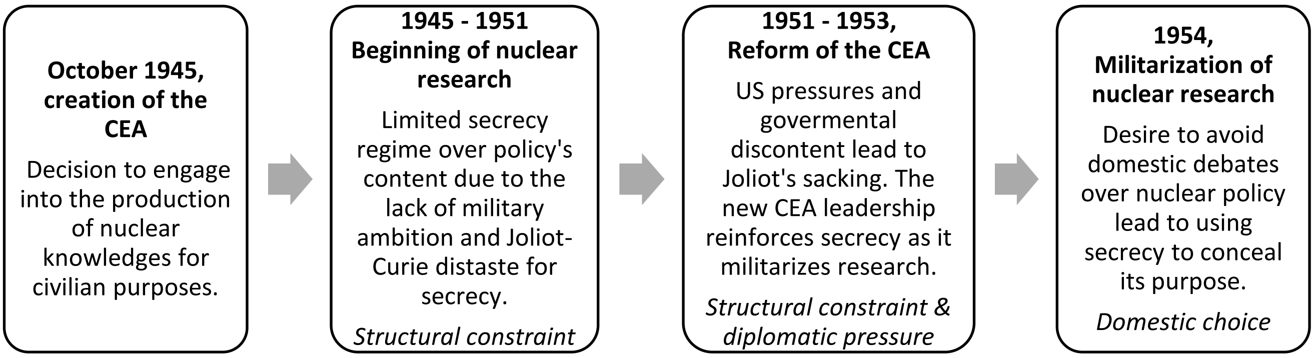

Figure 8 - Secrecy decision-making in France (1945 – 1954)

a. Refusing secrecy: Joliot-Curie, Dautry, and the first (civilian) CEA

On the 18th of October 1945, the French Commission for Atomic Energy (CEA) was created. At its head, stood two men: a General administrator, Raoul Dautry, and a High commissioner, Frédéric Joliot-Curie. One would manage the administrative aspect of the enterprise, while the second would be in charge of scientific questions. The model was not unlike the Manhattan project's division between Groves and Oppenheimer. The analogy ends there. The CEA, at its creation, was not originally made for military purposes. In its first years, the CEA did *not* pursue nuclear weapons, and its leadership never really considered this possibility. As Robert Belot has shown, military research at the CEA between 1945 and 1951 only meant research regarding protection against atomic bombs.[149] The creation of the CEA was one of de Gaulle's first major decision as the head of the French Provisional Government, which ruled France after June 1944. Alice Coutrot notes that "its elaboration escaped ordinary actors of legislative decision-making and was made in the greatest secrecy".[150] de Gaulle had been aware of the US atomic research efforts since July 1944, when some of the "Free French Atomists" met with him in Ottawa and revealed to him the purpose of the research effort.[151]

From the onset, the CEA was an exceptional institution. It enjoyed many privileges and was not subject to the many accountability mechanisms which would have allowed the parliament to acquire information about its activities. It was remarkably free from any budgetary controls, having only to submit a general envelope to the Parliament. This exception allowed the CEA not to precisely describe its activities to the MPs. In July 1947, those privileges were reduced: noticing that the CEA benefited from important funds while being "subtracted from normal rules of public accounting", the Finance commission asked for a greater control.[152] These practices were not justified by clandestine activities. In the words of its administrator, this practice rather allowed to "answer instantly the various needs and problems of the

[149] Robert Belot, *L'atome et La France. Aux Origines de La Technoscience Française* (Paris: Odile Jacob, 2015), 141.
[150] Aline Coutrot, "La création du Commissariat à l'énergie atomique," *Revue française de science politique* 31, no. 2 (1981): 343.
[151] Coutrot, 345.
[152] Séance du 19 juillet 1947, Débats parlementaires à l'Assemblée Nationale, *Journal Officiel*, 20th July 1947, 3901. Personnel and administrative expenses subsequently became subjected to a similar regime than other public establishments. Séance du 1er août 1947, Débats parlementaires à l'Assemblée Nationale, *Journal Officiel*, 2nd August 1947, 3856.

scientists without having planned for those needs 15 to 20 months before they were even suspected".[153] They were the result of Joliot's desire – he insisted on the CEA's financial autonomy – and of de Gaulle's impatience: Joliot wanted the CEA to have a freehand, and de Gaulle, in September 1945, wanted things to move quickly.[154] The CEA's exception was not simply the result of its exceptional object, but of the men who composed it and managed to negotiate a considerable share of autonomy inside a loosely built state. As a result, the CEA answered directly only to the head of state, not to other ministries. It also was accountable to a small control committee composed of high civil servants.[155] The CEA activities during its first years of exercise essentially consisted in recruiting personnel, prospecting for uranium on the French territory and abroad, and building the foundations for atomic research in France. It grew rapidly.[156] Yet, it was not particularly secret.

It is likely that Joliot perceived secrecy mainly as a way to protect the CEA's (public) research from private firms. Joliot, and most of the CEA's scientists, believed in a statist economy, and was wary of the private industry.[157] In this sense, secrecy in the first CEA was essentially a form of "industrial secrecy". It seems that, originally, the idea of keeping secrecy around the CEA's research was put forth with the justification that it could be of interest for national defense.[158] Joliot himself became opposed to scientific secrecy and had criticized the US choice of nuclear secrecy. He was not, however, oblivious to the need for caution when interacting with commercial industries. Joliot wished to limit the diffusion

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[153] Notes from a lecture given by Raoul Dautry at "Sciences Po", 23rd May 1951, 307AP/54, AN. A very similar justification was put forth by British policymakers when deciding upon the creation of Harwell: "While, of course, there can be no impairment of the usual Parliamentary control over the expenditure of voted money, some system of administration must be devised which will allow a free hand in the allocation of available funds to those responsible for administering the experimental establishment.", Memorandum by the Chancellor of the Exchequer, "Tube Alloys – Future Policy and Programme", undated, Top Secret, FO 800/547, TNA.
[154] Matthew Adamson, "Commissariat of the Atom: The Expansion of the French Nuclear Complex, 1945-1960" (Doctoral Dissertation, Richmond, Indiana University, 2005), 73–74.
[155] The *Cour des Comptes* is the French court in charge of controlling the use of public finances.
[156] In 1946, the CEA was composed of 245 agents. The year after, it had recruited almost 500 new personnel, reaching 716 agents. The construction of the first pile was on its way, and various services were being created. It had also started producing various equipment. and to produce study on graphite. CEA, "Note sur le Commissariat à l'Energie Atomique", 23rd September 1948, 307AP/223, AN.
[157] As confirmed by CEA physicist André Finkelstein which mentioned that scientists at the CEA looked with "suspicion" at "knowledge transfers toward the industry" in the 40s. Interview with André Finkelstein, 551AP/14, vol. III, interview n°XIV, 18th February 1988, 5.
[158] CNRS, Untitled notes on the CEA's situation, 28th December 1950, 19800284/221, AN.

of technical information in more political or administrative circles, for fear of leaks.[159] At the same time, he, and the Scientific Committee more generally, opposed the indiscriminate use of the "Secret" stamp over CEA documents, by fear that these stamp would create more attention than needed.[160] The Châtillon Fort, where experimental research took place was subjected to particular secrecy regulations, its director being instructed to "ensure (…) the general security and secrecy imposed by the nature of research pursued by the Commissariat"[161]. It was guarded by a team of police officers – from the municipal, however, and not the national police.[162] But their presence seemed justified less by secrecy than by the need to guard the "precious" materials kept on the site.[163] Similarly, the direction for homeland security (DST – *Direction de la Surveillance du Territoire*) performed control over parts of the personnel, but it seemed mainly concerned with the general criminal records of applicants, or with their wartime behavior – some were indeed refused for acts of collaboration, or participation in Nazi brigades.[164] It seems that the DST control practices had its limits as investigations are described as "very shallow" in internal notes.[165] Moreover, some managed to enter the CEA without passing through such a control. This was the case for Jean Pierre Vigier, a mathematician and Air force captain, whose assignment at the CEA seem to have been personally negotiated by Joliot, without the General Administrator's knowledge.[166] It is not a purely anecdotal case: Vigier was a war hero and member of the Résistance, but also a communist. During the war, he and his wife were member of the *Rote Drei*, a Soviet military intelligence

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[159] CEA, Procès-verbal "Comité Scientifique – Réunion du 24 mai 1946", 24th May 1946, Archives Joliot-Curie, F72, BNF.
[160] CEA, Procès-verbal "Comité Scientifique – Réunion du 5 novembre 1946", 5th November 1946, Archives Joliot-Curie, F72, BNF.
[161] CEA, "Note sur l'organisation des services du Commissariat", June 1948, 307AP/223, AN, 21.
[162] Note "Le Commissariat à l'Energie Atomique (C.E.A)", 9th March 1954, Très Confidentiel, GR 1 Q19/2, SHD, 8
[163] CEA, Rapport d'activité du Commissariat à l'énergie atomique du 1er Février 1946 au 1er mai 1947, undated, Archives Joliot-Curie, F71, BNF, 14.
[164] Most of those who were ruled were being accused of various misdemeanors, from petty theft to gold traffic. Note "Statistiques des enquêtes concernant le personnel du CEA, effectuées jusqu'à ce jour", 14th January 1950, 307AP/223, AN.
[165] Note "Nature, organisation, et fonctionnement du département de sûreté et de protection du secret au Commissariat à l'énergie atomique", undated, AG(5)/1/855, AN.
[166] Letter from Dautry to Lescop, 2nd March 1948, 307AP/223, AN.

network and were suspected of having maintained such links after the war ended.[167] According to Bertrand Goldschmidt, the Communist Party also imposed on Joliot the choice of a personal secretary.[168]

Short of a military program, there existed, for the CEA's administrator, not particular need for secrecy beyond basic caution. As Dautry wrote in a letter to the prime minister in May 1949, the CEA's research "could not, for a long time, play a role in national defense": "Of course, every agent must rigorously keep secrecy over what he does, what he sees, what he hears, but for now, none of that has a direct relation with armament issues" and therefore there was not much to fear.[169] This position, however, was criticized by outsiders from the CEA, who saw the problem of nuclear research differently, and sought a firmer information control regime.

Domestically, members of the parliament or of the security services despised the idea of a Communist – Joliot – at the head of an institution which could have strategic interest. In May 1947, France had experienced unrest after the exclusion of Communists ministers from the Ramadier government. 1947, historian Jenny Raflik notes, characterized a rupture in French postwar history, particularly because the rhythm of French politics suddenly becomes much more embedded in international politics. From then on, "the Cold war prints its rhythm on national politics (…) because France lacks the means – financial, military, political – to free itself from it".[170] As it turns out, French anti-communists were not the only one to want Joliot out of the CEA: the Americans – and to a lesser extent, the British – also disapproved of him. Anglo-American worries regarding Joliot had existed before 1947. Because of his communist sympathy, he was suspected of being at risk to sell "atomic secrets" to the Soviets or other countries.[171] The British even considered preemptively arresting him.[172] In 1947, he considered cooperating with

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[167] Virgile Besson, "VIGIER, Jean Pierre", Dictionnaire Maitron, [online: https://maitron.fr/spip.php?article181611]; See also Annex I in Ministry of Defense, "Rapport sur l'organisation le fonctionnement et la sécurité des organismes de recherche scientifique intéressant la défense nationale", 30th July 1948, Très Secret, F/60/3053, AN.
[168] Interview with Bertrand Goldschmidt, 551AP/13, AN, vol.II, Interview III, 25th June 1987, 4.
[169] Cited by Dautry himself in a draft letter to Queuille from October 1951, 307AP/223, AN.
[170] Jenny Raflik-Grenouilleau, *La République Moderne: La IVe République, 1946-1958* (Paris: Seuil, 2018), 101–2.
[171] Letter from Lt. Col. S.M. Skinner to Col. W.R. Shuler, Subject: Atomic Experiments in France, 18th February 1946. Top Secret, available online: https://nsarchive2.gwu.edu/NSAEBB/NSAEBB184/FR01.pdf.
[172] The idea remained a secret until the publication of Margaret Gowing's official history, and the revelation caused quite an embarrassment for the British cabinet. Minute for Mr. Wright, 21st January 1965; Letter from J.O Wright to Alain Manevy, 23rd January 1965, PREM 13/1956, TNA.

Belgium on atomic research. The project worried the US ambassador who reached out to the State Department with the project of "debunking his scientific reputation" so as to prevent the Belgians from contracting a deal with him. The Department of State rejected the project, deeming it impossible – Joliot was not "a man who trades on a family name", he certainly was a major nuclear physicist.[173] That was, in fact, the key problem: as a leading physicist, he might discover the "secrets" on which the United States sought to establish a monopoly. As a communist, he might be willing to share them with the USSR or could be manipulated into doing so. Although privy to none of the US nuclear secrets, he nevertheless represented a US security risk. And he was the leader of the CEA.

French officials were aware of Joliot's difficult position. In 1945, even before the CEA was created, an internal memo signaled to de Gaulle that the scientist's communist affiliation was likely to create problems. It urged de Gaulle to deter the "Anglo-Saxons" from "willingly trusting him with information about their research done since 1940".[174] De Gaulle's decision to nominate Dautry at the head of the CEA was apparently driven by his desire to have him "keep an eye on all those commies".[175] But over the years, Joliot multiplied statements against nuclear weapons and in favor of the USSR. His engagement became a growing thorn in the side of the CEA, as it attracted criticism from the political opposition and from the US press. In March 1948, Henri Monnet, elected to the French senate, proposed lowering the CEA's budget by 1 million francs – a symbolic gesture, as the budget totaled around 2.000 million francs. Although not naming Joliot, Monnet focused specifically on the CEA and on some of its leaders "whose thought presents a troubling synchronism with Stalin's Russia". Directly referring to the British efforts to "purge" its sensitive sectors, he argued that France should follow a similar path. His proposition involved "a college of indisputably independent men" whose role would be to "determine the responsibilities for the preservation of secrecy which cannot be uniquely limited to accounts submitted to the Parliament". His speech was not only about the CEA, but Monnet insisted that it was

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[173] The Secretary of State to the Embassy in Belgium, 14th May 1947, Top Secret, FRUS, 1947, The United Nations, vol.1, 813-816.
[174] Coutrot, "La création du CEA," 351.
[175] Goldschmidt, *Pionniers de l'atome*, 352.

the "most important" problem.[176] The speech was not well received. Tumults ensued and led to the session's suspension. The amendment was rejected after a tight vote.

Nevertheless, the idea that the CEA might not be a safe place for nuclear secrets began to take root. In July, a secret report from the Ministry of Defense provided a similar, although much more detailed, criticism of the CEA's security practices. While the report deals with all aspects of scientific secrecy related to military research, it first and foremost discusses the problem of *nuclear* secrecy. Calling for a "true epuration (…) starting with the head", the report declared war on Joliot, whom it accused of having organized, "following an anticipated and well-established plan", the "communist intrusion in our scientific research".[177] More interestingly, it also noted that in such circumstances,

> "we are not at all surprised by the total lack of trust toward us expressed by the Americans, and their refusal to communicate the least amount of documents about their wartime or current researches, as well as their fear, likely justified, to find their most interesting discoveries passed on to the USSR."[178]

External criticism, public and private, started to affect the CEA's functioning. Joliot's secretary, Léon Denivelle, resigned in July, followed a little later by physicist Pierre Auger.[179] In the fall of 1948, Henri Queuille, head of the French government, rejected Dautry's offer to visit the premises of the CEA, promising to come only "after the storm".[180] Fortunately for Dautry and Joliot, the CEA was close to its greatest achievement so far: the initiation of the first French atomic pile, ZOE.[181]

But the technological success did not bear the expected fruits. If France now had a working pile, would it not mean that it was on a serious path toward a nuclear arsenal? If so, was it reasonable to leave a

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[176] Séance du Jeudi 18 mars 1948, Débats parlementaires au Conseil de la République, *Journal Officiel*, 19th March 1948, 808. On that same day, Irène Joliot-Curie was being detained at Ellis Island and refused access to the United States for her communist sympathies. Rémi Baudouï, *Raoul Dautry: 1880-1951: Le Technocrate de La République* (Paris: Balland, 1992), 347.
[177] Ministry of Defense, "Rapport sur l'organisation le fonctionnement et la sécurité des organismes de recherche scientifique intéressant la défense nationale", 30th July 1948, Très Secret, F/60/3053, AN, 19.
[178] *Ibid*. 25.
[179] Baudouï, *Raoul Dautry*, 350.
[180] Letter from Raoul Dautry to Henri Queuille, 4th December 1948, 307AP/40, AN.
[181] Its name stood for *Zéro énergie, Oxyde d'uranium and Eau lourde* (Zero Energy/Uranium Oxyde/Heavy Water). Lew Kowarski, who was responsible for its construction initially wanted to name it "the French Low Output Pile", or FLOP, unaware that the acronym had a different meaning in English… Vladimir Halpérin, *Raoul Dautry: Du Rail à l'atome: L'aventure Sociale et Technologique de La France Dans La Première Moitié Du XXe Siècle* (Paris: Fayard, 1997), 230.

communist at its head? What should have helped the CEA turned out to be the ground for renewed attacks on its weak security. The foreign press was now part of it. *The Economist* implicitly accused Joliot of being a source of leaks to the USSR. In a failed attempt at crisis management, Dautry only made things worse.[182] Joliot eventually had to justify himself in front of the British and American Press. During a dinner organized by the Anglo-American Press Association, he defended both his person, and the CEA's, ability to keep secret. About him, he declared that "a French communist (…) cannot honestly think about communicating to whatever foreign power results which do not belong to himself, but to the collectivity which allowed him to work".[183] Regarding the CEA, he also used this opportunity to insist that his institution was not some spy nest. Rather, he told the press that the CEA had a clear regime of secrecy, distinguishing between knowledges related to civilian and to military uses of atomic energy.[184] This is an important point: Joliot was not rejecting the idea that some knowledges *had* to be kept secret and treated carefully. He rejected the notion that it was his problem. The CEA's goal was not to produce nuclear weapons; therefore, it was an issue of secondary importance.

It was not enough. The CEA crisis deepened further still in March 1949, with the arrest and house search of several employees, who were accused of mishandling secret documents by the DST. Certainly not by chance, many among them were also members of the communist party.[185] None of them were in serious trouble, as most of the documents did not relate to the CEA's research.[186] The clear signal of the security services' hostility toward the CEA angered the personnel, who, in an open declaration to their direction, complained that the arrests were unjustified and contributed to "spread the opinion that the CEA works on armaments".[187] These two issues started to become a growing concern for the government. Immediately after the arrests, on the 9th of March 1949, the Ministry of Justice instructed its services to investigate the possibility of a specific law to regulate nuclear secrecy. Although drafted in general

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182 Baudouï, *Raoul Dautry*, 353.
183 "'Un communiste français ne peut penser à communiquer à une puissance étrangère des résultats qui appartiennent à la collectivité' déclare M. Joliot-Curie", *Le Monde*, 6th January 1949.
184 Draft "Allocution prononcé par M. Joliot-Curie au déjeuner de la presse anglo-américaine du 5 janvier 1949", Archives Joliot-Curie, F36, BNF.
185 "Le géologue arrêté jeudi est inculpé d'atteinte à la sûreté extérieure de l'Etat", *Le Monde,* 5th March 1949.
186 See Letter from Dautry to Lescop, 7th March 1949, N.R.n°1003, 307AP/46.
187 "Déclaration votée à l'unanimité par le Personnel de Châtillon réuni en Assemblée, le 4 mars 1949", 4th March 1949, 307AP/223, AN.

terms, the project aimed specifically to "forbid civil servant, and in particular those belonging to the Center of Atomic Research, to bring home secret documents". It sought to prevent the use of military secrecy law to prosecute CEA employees as, "if we tried to implement a text about military secrecy to protect the atomic secrets, the French government will hear accusation that it is preparing for atomic war".[188] The investigation, as subsequent notes agree, was "motivated by consideration of political" and not legal order.[189] The Ministry of Justice had little hope that such a law would solve the problem, and admitted that the text could, at best, be "very vague". He nevertheless pushed for it, and asked that the matter be treated urgently, indicative of the highly political nature of the issue.[190] For an unclear reason, the project eventually failed, as the CEA eventually retracted its support.[191]

Had this project succeeded, would the CEA situation have changed? It is unlikely. By 1950, Joliot's position was becoming untenable. The Fuchs case only made things worse for him, and as the United States dove deeper into McCarthyism, the idea of a communist physicist at the head of an ally's nuclear research was not exactly appreciated by US officials. Some in the Department of State started to inquire "whether there was any means of putting leverage on the French to clear their atomic house", considering that "that whole field in France was rather badly tainted with Sovietism". It was starting to become an issue, particularly as the CEA multiplied cooperation with Norway and Sweden and efforts should be done "to prevent Joliot Curie from contaminating the Scandinavians".[192] Such worries were expressed directly to François de Rose, the French diplomat in charge of atomic affairs at the *Quai d'Orsay*.[193] The Norwegians were even told that the US had decisive proof that Joliot worked directly for the Soviets, in an attempt to prevent cooperation between the two countries.[194] This would be, however, the most the

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188 Direction des affaires criminelles et des grâces, Note for the Minister of the Justice, 22 March 1949, 19950317/126, AN.
189 Handwritten notes, "Défense Nationale, 2 March 1950", 8th March 1950, 19950317/126, AN.
190 Note for the Directeur des affaires criminelles et des grâces, 9th March 1949, JV/AD/333, 19950317/126, AN
191 Handwritten notes, "GDS, 20 mars 1950", 27 March 1950, 19950317/126, AN.
192 Memorandum of Conversation, by Mr. David H. McKillop of the Office of the Under Secretary of State (Webb), "Subject: Meeting with H. Freeman Matthews, U.S. Ambassador to Sweden." [Washington,] May 3, 1949. Top Secret, FRUS, 1949, National Security Affairs: Foreign Economic Policy, vol. I, 470.
193 Memorandum of Conversation, by Mr. Joseph Chase of the Office of the Under Secretary of State (Webb), "Subject: Atomic Energy Questions Concerning France and the United States", [Washington,] December 21, 1949, Secret, FRUS, 1949, National Security Affairs: Foreign Economic Policy, vol. I, 620.
194 Astrid Forland, "På Leiting Etter Uran: Institutt for Atomenergi Og Internasjonalt Samarbeid 1945-51," *Forsvarsstudier* 3 (1987): 15.

Department of State was willing to do to obtain Joliot's sacking. Aware of the criticism Joliot faced at home, US officials chose to simply sit and wait, "a policy of avoiding any step which would create the appearance that we were pressurizing the French to achieve this end." Joliot was annoying, but also useful: it provided an excellent excuse not to cooperate with the French.[195] Joliot, on his side, made little to no efforts to contain the crisis. He became the first president of the World Peace Council, in March 1950, and the first signatory of the Stockholm Appeal opposing the existence of nuclear weapons anywhere.[196] In April 1950, he was removed from his position at the CEA. This ended the Joliot crisis, but not all of the CEA's problem with secrecy. Following Joliot's sacking, Dautry was kept on as the administrative head of the CEA. The first quinquennial plan for Atomic energy (1946-1951) was coming to a close and his institution was severely threatened.[197] Even after Joliot's sacking, parliamentary attacks did not stop: the CEA was still considered a communist nest. Speaking in front of the Assembly, Edouard Frédéric-Dupont accused the CEA of being "an annex to the Soviet Russians atomic research service" and argued that the state of France's secrecy prevented it from receiving any technological assistance from its allies.[198]

An aging Raoul Dautry was now alone in assuming the task of administrating the CEA. As he prepared for the defense of his track record during the first quinquennial plan of the CEA, he appears aware that as "the first quinquennial period expires, it is imperative that, during the second, the life of the Commission takes place with impeccable order and methods".[199] 1951 began with some success for him, as he was reinstated as the head of the CEA for five years. In his new year's address to the CEA personnel, Dautry took the care to re-assure them that "their civic rights are always respected" as agents of the public service – a hint at Dautry's reluctance to engage in the witch hunt called for by the

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[195] Summary Log of Atomic Energy Work in the Office of the Under Secretary of State, February 1, 1949–January 31, 1950, [Washington], Top Secret, FRUS, 1949, National Security Affairs: Foreign Economic Policy, vol. I, 627.
[196] Petra Goedde, *The Politics of Peace: A Global Cold War History* (New York, NY: Oxford University Press, 2019), 13.
[197] Baudouï, *Raoul Dautry*, 362.
[198] Séance du vendredi 29 décembre 1950, Débats parlementaires à l'Assemblée Nationale, *Journal Officiel*, 30th December 1950, 9782.
[199] Letter from Dautry to Lescop, 24th December 1950, 307AP/51.

Parliament.[200] Eisenhower came on a visit to Paris a few weeks later. Some members of the CEA went on strike. Identified, six of them were immediately fired. The Parliament launched a new offensive, against the Government that time, threatening to engage its responsibility "if, tomorrow, as a consequence of the previous commissioner for atomic energy, an incident would happen, some documents' "stroll" toward countries with interest" in France's atomic research. The "last communists legacies left by M. Joliot-Curie" had not been eliminated: the president of the Commission for National Defense now "called for this epuration to be done".[201] The Government seized the momentum. At the end of April, Henri Queuille, head of the Government, sent letters to Raoul Dautry and to Francis Perrin, Joliot's replacement. In these, he outlined a new policy for the CEA's personnel. Considering the "importance of the tasks which are incumbent upon the Commission" the government now "cannot be disinterested in the behavior of its personnel." He laid out "the necessity for the personnel of the Commission for Atomic Energy, which participates in an enterprise whose activities are of interest to National Defense, to show loyalism". "Agents whose behavior, envisioned under the national angle, would be incompatible with the exigencies of public interest" should not be hired, and as for "those who do not "offer, from a national perspective, the guarantees that the Government is entitled to expect", they should be "eliminated" – meaning, sacked.[202] The tone was stronger, even, when addressing Francis Perrin. To the scientific head of the CEA, it made clear that the government now wanted that General Administrator, and not the scientists, to be responsible for recruitments. Perrin apparently had the opportunity to voice his concern to Queuille that in the current state of affairs, "the protection of secrecy over the work and research of the Commission did not require particular measures and a brutal elimination of the elements whose loyalism would be insufficient would disorganize the services". For the President, such considerations did not matter: they should be sacked nevertheless.[203]

[200] Note au personnel du Commissariat à l'énergie atomique, 4th January 1951, RL n°3969, 307AP/223, AN.
[201] A highly loaded term, only five years after the post-war *épuration* against collaborators of the German occupation. Séance du Mardi 3 Avril 1951, Débats parlementaires à l'Assemblée Nationale, *Journal Officiel*, 4th April 1951, 2610.
[202] Letter from the Prime Minister to Dautry, 23rd April 1951, 307AP/224, AN.
[203] Letter from the Prime Minister to Francis Perrin, 23rd April 1951, 307AP/224, AN.

With these letters, Queuille also enunciated a new governmental policy toward the CEA. The organism, which had before that benefitted from an exceptional freedom, would now have to submit to stricter control in the interest of national security. The paradox of the situation was that everyone seemed concerned with the risks of leaking nuclear secrets to the Soviet Union, and worried about the lack of specific measures toward the protection of nuclear secrets, *except the CEA*. Dautry, who could not be suspected of disloyalty toward a state he served his entire life, strongly rejected reforms. The idea that the CEA should be secret seemed at odd with his own conception of its work. To Queuille's demand who asked for more secrecy in the name of national security, Dautry opposed the absence of military program. One of his advisor suggested that he insisted upon "the fact that the Commission, in the last five years and for quite a long time still – perhaps the five years to come – has been a teaching establishment, designed to train scientific workers in the field of atomic energy, and that it is unlikely (…) that we would have until 1955 to keep any atomic secrets (but we would have industrial secrets)".[204] For those inside the CEA, the knowledges produced were nuclear, but these were not "atomic secrets". For those outside, the distinction between the two kind of nuclear knowledges – the industrial, peaceful, kinds, and the secret, dangerous, ones – was too blurry and required always erring on the side of caution. In a letter written during the summer of 1951, Dautry outlined his argument to the government, both against secrecy and against personnel control. He refused, first, to take recruitment prerogatives away from the scientific part of the CEA, one of Queuille's demands. Moreover, he expressed skepticism toward the idea that more secrecy would provide more security. In spite of all their efforts, the US and UK secrecy machines did not prevent leaks, "to the point that an essential piece of the secrecy machine seems to be a colander". And, in any case "nothing can plausibly be discovered in France, in the domain of scientific research (…) which could reasonably worry anyone." There "exist[ed] no economic issue more important for the future of France" than the *peaceful* use of atomic energy, and military applications were, so far, out of the picture.[205] His letter, however, was never sent – or not by Dautry, anyway. On the 21st of August, Dautry died at his desk. His campaign for a CEA independent from any

[204] Jean Toutée, cited in Baudouï, *Raoul Dautry*, 366.
[205] Draft letter from Dautry to the Prime Minister, October 1951, 307AP/224, AN.

form of political constraints, and with limited information control, died with him. About a year after Joliot left, Dautry's death brought the end of the first CEA.

From 1945 to 1951, the CEA constituted a peculiar object. Exceptional *de facto* and *de jure*, its exceptionality was less a product of what it did, than of the men who did it. The general awareness of the new science's promises facilitated their task, even though such an exceptional status rapidly drew criticism from Parliament. Generally aware of the need for secrecy in atomic research, such an imperative stemmed less from a conscience of nuclear knowledges' inherent risks, but rather from the desire to keep industrial secrets safe – since, after all, the CEA was not trying to make a bomb. After 1948, however, this position slowly became untenable. Domestic critics started to question the wisdom of entrusting communists with nuclear knowledges – be they largely outdated – while the US pressure added to the conundrum. The US Department of State did not necessarily do much but its open opposition to Joliot was enough to justify criticism and fears that his presence might lock the door to technological assistance. Slowly, then forcefully, exceptionalism set in: nuclear knowledges *had* to be treated differently than other secrets, and no peculiar justification was necessary – nor was it possible to argue against it, as tried Dautry. The "first CEA" shows the difficulties in not being particularly cautious about nuclear secrets: even when not pursuing military research, the uncertainty surrounding the nature of nuclear knowledges blurred the distinction and imposed a specific mode of governance. Though Joliot and Dautry managed to fight the structural constraints toward secrecy, their behavior grew more and more costly, and eventually untenable. After Dautry's death, France embraced nuclear secrecy. It did so because, mainly, the distinction between industrial and military secrecy was not tenable: Pierre Guillaumat, the CEA's new head, clearly wanted nuclear weapons.

b. Choosing the bomb, choosing secrecy: French nuclear politics after Dautry

The decision to engage in a nuclear program was not taken overnight, but rather matured inside different administrative circles over the course of almost two years before imposing itself to the political leadership. Through these circles, the idea that a nuclear bomb project would have to be carried through secretly imposed itself too. This happened because the idea that nuclear knowledges were exceptional did not meet opposition anymore. With Guillaumat, secrecy was met with enthusiasm. And he was not

the only one. In fact, the debate over the bomb's construction was fought over a specific question: who was secretive enough to engage in such a project? For Army General Bergeron, the CEA was a communist-filled place, which might offer useful technical skill but should be left out of such a sensitive project when possible. By contract, Guillaumat maintained that the CEA was fully able to keep secrets. In the end, the CEA won the turf war and became the main actor in charge of the nuclear program. Both men managed, at least, to agree on one thing: whoever was in charge should not ask for the people's opinion. Nuclear weapons were something to be built *in secret*, but also *secretly*. Fearing opposition, administrative actors pushed for secrecy over the entire project to avoid debates. When Pierre-Mendès France came to a political decision at the end of 1954, he agreed with them. And with that, France chose not only to have a nuclear program, but also to embrace nuclear secrecy.

i. France's decision to build the bomb: secrecy and decision-making.

It is important, first, to understand that the term "decision" is a simplification, as France's nuclear program was the result of a series of decision taken by several administrative actors, particularly in the CEA, which were eventually tacitly endorsed by the political leadership in late 1954. The process started in 1951, after Dautry's death. His interim successor, René Lescop, seems to have been a supporter of the bomb option, and of stronger information control. He held the position of General administrator only for a few months, before returning to his role of Secretary General. In those few months, however, he would take some decision in stark contrast with Dautry's leadership, notably the decision to fire *en masse* personnel deemed politically undesirable or suspicious – that is, communists. Dautry always had qualms in that regard. The 6 employees who participated in a demonstration against Eisenhower visit in France were only fired after he had made sure that the CEA was not being treated differently than other public body – and when he learned that he had been misled, he asked for explanation.[206] Lescop had a different view. In 1950, already, he had voiced his concern regarding communists at the CEA. According to Goldschmidt, he was among the first to say, "if we ever want to make a bomb, it is impossible with

[206] Draft letter from Dautry to the Prime Minister, 9th May 1951, 307AP/224, AN

such a commission with Joliot and too many communists".[207] Once Lescop was in charge, there suddenly was fewer, as he fired more than 80 employees for their political allegiance.[208]

He applied to the General administrator position but was set aside and replaced shortly afterwards by Pierre Guillaumat. Guillaumat was a highly regarded administrator, who occupied the strategic position of director for fuels at the Ministry for Industry. He wished to pursue an ambitious industrial policy for nuclear energy in France – his previous position had made him well aware of its vulnerability – as well as a military policy. Before he arrived, scientists were discussing the Commission's future work, notably the construction of several large piles for electricity production. Francis Perrin, Joliot's replacement, vainly opposed that choice, aware that large piles would produce large quantities of plutonium and might stir the military's desires up.[209] Guillaumat, precisely, wished to go that direction. One of his first move at the CEA was the creation of the *Direction Industrielle*, tasked with the production of new reactors, but also with the construction of a plutonium production facility "as quickly as possible".[210] As Gabrielle Hecht as shown, Guillaumat's choice for what became the G1 reactor was guided by the issue of plutonium production and "no one even mentioned extracting electricity from G1 until its design was almost finalized".[211]

His plans were facilitated Felix Gaillard, who had been named under-secretary of state for Atomic Energy in 1951. Gaillard was ready to push for the CEA's development. Particularly, he pushed for the 1952-1957 quinquennial plan for atomic energy, voted in July 1952, which laid out the CEA's ambition to build not only large piles, but also a plutonium production facility. This choice became "the basis of the French bomb".[212] This, of course, was not lost on the Parliament which understood what plutonium production entailed. The Communist Party proposed an amendment to guarantee that the plutonium

[207] Interview with Bertrand Goldschmidt, 551AP/13, AN, vol.II, Interview III, 25th June 1987, 9.
[208] Note "Le Commissariat à l'Energie Atomique (C.E.A)", 9th March 1954, Très Confidentiel, GR 1 Q19/2, SHD, 15.
[209] Interview with Bertrand Goldschmidt, 551AP/13, AN, vol.II, Interview III, 25th June 1987, 10. As Dominique Mongin noted, Perrin's assessment was incorrect: most in the military were not then in favor of the bomb. Mongin, "La Genèse de l'armement Nucléaire Français. 1945-1958.," 189.
[210] Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, (Cambridge, Mass: MIT Press, 2009), 64.
[211] Hecht, 64.
[212] Lawrence Scheinman, *Atomic Energy Policy in France under the Fourth Republic* (Princeton: Princeton University Press, 1965), 93.

produced would not be used for military purposes. The amendment was rejected, Felix Gaillard argued that France could not deny itself this opportunity for the future. But, as Jacques Hymans writes, this should not lead one to conclude that this plan was “a fig leaf for a weapons drive”. Gaillard, himself, was not pro-bomb and even “slightly anti-military”.[213] The amendment was rejected in part because some MP refused to give a victory to the communists.[214] It would be in Marcoule, nevertheless, that the plutonium for the first French nuclear device was produced.

At this point, in 1952, few actors inside the state were in favor of an atomic armament.[215] Many shared the belief that nuclear weapons were unlikely to be used in case of war in Europe. So convinced, in fact, that for most of the 50s, war planners essentially excluded nuclear weapons from its analysis, even though nuclear weapons were discussed in some training venues.[216] In September 1952, minister of defense René Pleven asked General Bergeron, in charge of the Scientific Committee for National Defense (CASDN), for a report on the possibility of a military nuclear program.[217] Bergeron answered in May 1953, suggesting that France was “now for the first time in front of the possibility of achieving an atomic bomb, in 1957 at best, if we manage to create a detonating system”.[218] He would, from then on, become a fierce supporter of the French program, he who, as late as 1952, saw little value in this

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213 Jacques E. C. Hymans, *The Psychology of Nuclear Proliferation: Identity, Emotions, and Foreign Policy* (Cambridge, UK ; New York: Cambridge University Press, 2006), 92, fn 25.
214 Hecht, *The Radiance of France*, 62.
215 Particularly, the military was not yet on board. For the military, the choice was between “empire and the bomb” that is, resources to pursue France’s colonial wars overseas and maintain the remnants of its declining empire, while ensuring European security through NATO, or investing a large number of resources for a nuclear arsenal and a more independent European defense, at the risk of neglecting the colonies seen by some as the “weak point” of the Western world. Jean Delmas, “A La Recherche Des Signes de La Puissance. : L’armée Entre Algérie et Bombe A,” *Relations Internationales*, no. 57 (1989): 77–87. In that regard, it shows a counter-intuitive, link between nuclearity and imperialism, perceived as opposed, even though the former largely was a continuity of the latter (the reference being, of course, Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, Mass: MIT Press, 2012).
216 Jean-Christophe Sauvage, “La Perception Des Questions Nucléaires Dans Les Premières Années de l’Institut Des Hautes Etudes de Défense Nationale (1948-1955),” in *La France et l’atome. Etudes d’histoire Nucléaire.*, ed. Maurice Vaisse (Bruylant: Bruxelles, 1994), 59–82; Charles Ailleret, *L’aventure Atomique Française. Comment Naquit La Force de Frappe.* (Paris: Grasset, 1968), 199–202.
217 Dominique Mongin, “Le Rôle Des Militaires Dans Le Choix de l’arme Atomique Avant 1958,” in *Militaires En République (1870-1962). Les Officiers, Le Pouvoir et La Vie Publique En France.*, ed. Olivier Forcade, Eric Duhamel, and Philippe Vial (Paris: Editions de la Sorbonne, 1999), 93.
218 Note from the General Bergeron, “Note sur les Etudes atomiques de défense nationale et proposition d’études et de moyens d’études”, 19th May 1953, n°45/CAB/S, Secret/Confidentiel, GR1 Q19/2, SHD.

kind of effort.[219] By 1954, a small yet powerful network of actors calling for a French nuclear arsenal emerged.[220]

1954 is widely considered as a pivotal year. It was the year the political leadership and, most particularly the head of government Pierre Mendès-France tilted in favor of a sovereign nuclear weapons program. Mendès-France took power in June 1954. One of his first major decision was to get rid of the European Defence Community treaty, which could have prevented a French nuclear arsenal.[221] By October 1954, he had signed a secret decree creating the Superior Commission for Military Applications of Atomic Energy (*Commission supérieure des applications militaires de l'énergie atomique*), which formally – but secretly – authorized contacts between the Army and the CEA for the study of nuclear weapons and submarines.[222] The Commission never convened but on the 4th of November, a subcommittee for Nuclear Explosives (*Sous comité des explosifs nucléaires*) started its proceeding. Pierre Mendès-France was actively preparing for a nuclear option. Things moved quickly afterwards: on December 26th, 1954, Mendès-France summoned a large number of officials to a secret meeting, during which they discussed a draft decision whose first sentence simply was "the making of atomic bombs is decided".[223] That day, the French decision was taken – almost.

It is, in fact, difficult to trace the legacy of this meeting. Mendès-France himself later declared that he never quite made such a decision, either because he chose to interpret it as a choice to keep the nuclear program on track until the distinction between military and civilian research could be clearly made, or as a decision to pursue a bomb, but without the necessary budget allocations to fund it.[224] But, as historian Georges-Henri Soutou put it, his actions were "an essential step on the path to nuclear weapons".[225] His decision eventually "served as the crucial catalyst for the march to the French

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219 Mongin, "La Genèse de l'armement Nucléaire Français. 1945-1958.," 196.
220 Hymans, *The Psychology of Nuclear Proliferation*, 92., fn. 25.
221 Hymans, 97.
222 Bendjebbar, *Histoire Secrète de La Bombe Atomique Française*, 185.
223 Hymans, *The Psychology of Nuclear Proliferation*, 105.
224 Hymans, 106.
225 Georges-Henri Soutou, "La Politique Nucléaire de Pierre Mendès France," *Relations Internationales*, no. 59 (Fall 1989): 330.

bomb"[226], particularly because certain actors left the room with the conviction that Mendès-France had just authorized a military nuclear program. Prominent among them, was Pierre Guillaumat, and general Crépin.[227] The two key actors, the military and the CEA, now felt entitled to pursue this program, and confident that budgets would follow – and so they did.

ii. Secrecy as a given: military orientation, public deception and the concealment of nuclear politics.

How did this choice affect the French state's position on nuclear secrecy? When French officials chose to pursue a nuclear military program, they also chose to shroud it in utmost secrecy, creating strict information control practices designed both to prevent espionage and to avoid public debates. This choice was an obvious one: none among the key actors – General Bergeron, Pierre Guillaumat and Pierre-Mendès-France – seemingly opposed it. To the contrary, they all forcefully supported it, was because they all sought to prevent the emergence of domestic debates over nuclear acquisition. So much, in fact, that secrecy was central to the turf war between the military and the CEA over who was secretive enough to build a bomb clandestinely.

That such a competition took place is surprising considering the limited interest in nuclear weapons in the military. General Bergeron, head of the CASDN, started as a nuclear skeptic before becoming a supporter of a military-led nuclear program. Bergeron was convinced that a program of this kind "should be carried on very secretly, without it appearing on the military budget and informing at the CEA only the few scientists which could possibly be necessary".[228] This, he argued, because secrecy was "a defense imperative and even an inter-allied contractual imperative on the international level".[229] French political leadership, since Joliot's sacking, had made clear that nuclear knowledges should not be treated like any other industrial secrets. Bergeron's first concern, thus, was with the security implications of nuclear weapon technology, and the need for information control in that domain.

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[226] Hymans, *The Psychology of Nuclear Proliferation*, 107.
[227] Interview with Pierre Guillaumat, 551AP/13, AN, vol.II, Interview I, 3rd June 1987, 6.
[228] Note from the General Bergeron, "Note sur les études militaires atomiques", 10th January 1954, Secret/Confidentiel, GR1 Q19/2, SHD.
[229] Procès-verbal de la 21e réunion du Comité d'Action Scientifique de Défense Nationale, 20th January 1954, Secret/Confidentiel, GR1 Q20/3, SHD.

It was also a diplomatic imperative. France's obligations toward American nuclear secrecy had changed with the shift to nuclear deployment in Europe.[230] Although officials were largely favorable to the Atlantic Alliance, and in demand of US security guarantees (including nuclear), they also were largely frustrated by the US' policy of secrecy. George Bidault, then Ministry for Foreign Affairs, complained about the "mystery" which lingered "over the most important part of the forces; the Americans possess the secret and it is a very well-guarded secret".[231] When US military officials finally agreed to share some information, it was only on the condition of drastic secrecy restriction, as exemplified by a letter from General Ely to the French President, René Pleven, in which he "calls for [his] attention on the eminently secret nature of the report (…) My American colleagues took almost two years, since my first request, to half-open their file; they will continue to do so more largely, in the measure that they are convinced of our total discretion."[232] Joliot's legacy and, more generally, the American distrust for French security procedure had not disappeared. In 1956, Admiral Strauss closed – once again – the door to a cooperation with France on the basis that the US "could not, under existing laws and practices, execute a power bilateral involving classified material because it could not certify that the French security procedures were as reliable as our own".[233] Bergeron, as evidenced by a lecture he gave to officers in 1955, was fully aware of the "allies' susceptibility" in the atomic domain which meant that "the few persons who have precise information are sworn to secrecy and cannot tell anything, nor publish".[234]

But Bergeron was not pushing for information control solely over nuclear policy's content. He maintained that information control should serve another goal: to hide the true purpose of nuclear policy

[230] In the early 50s, in the hope of limiting the US military presence in Europe, Eisenhower engaged in a policy of nuclear sharing which consisted in deploying US nuclear weapons on Ally territory and integrating nuclear weapons in NATO. See Marc Trachtenberg, *A Constructed Peace: The Making of the European Settlement, 1945-1963* (Princeton: Princeton University Press, 1999), chap. 5. During the IVth Republic, no such weapons were deployed in France, but plans were made for hosting arrangements, thwarted only by de Gaulle's return to power in 1958. See Olivier Pottier, *Les Bases Américaines En France: 1950-1967* (Paris: L'Harmattan, 2003), 74–78.
[231] Raflik-Grenouilleau, *La Quatrième République et l'Alliance atlantique. Influence et dépendance, 1945-1958.*, 237–38.
[232] Letter from the General Ely to René Pléven, 29th April 1952, 560AP/48, AN.
[233] Memorandum of a Conversation, Washington, January 25, 1956, Foreign Relations of the United States, 1955–1957, Western European Security and Integration, Volume IV, 394.
[234] Conference by General Bergeron given at the IHEDN on the 4th January 1955, GR1 Q19/2, SHD.

from the public eye. Bergeron's plea for secrecy repeatedly referenced the need to wipe the project from all budget plans, or, at least, to wait for a few years before revealing it, by "integrating those expenses in other spendings".[235] Keeping the program secret allowed the government to limit the risks of espionage. But most of all, it allowed for limited public contestation. He could not have made this case more explicitly than he did for a military audience in 1955:

> "Should we launch studies on atomic bombs, and then a fabrication? The discussion has been largely opened and even in front of the public, which is regrettable; such a discussion, to stay objective as they must be and as is in the national interest, must stay between technicians and military officers on one hand, and in the Government's council on the other; they should even stay in a certain measure in the domain of secrecy, even as they are being realized. It was so under the Third republic for the construction of the 75mm field gun, for example"[236]

If secrecy was required, then, the bomb's builders should be able to keep their mouth shut. And for the head of military scientific research, the CEA could not guarantee this "due to its very regrettable initial politicization to which it is difficult to remedy".[237] By politicization, he obviously meant the scientists communist tendencies. His worries were fueled by an internal note from March 1954 which assessed that "in the current state of things, it is not certain that the CEA is fit to preserve the desirable confidential nature of its work".[238] Consequently, his opinion was clear: "the atomic team would be in better conditions in the Armed forces than in the CEA where there exists a majority of communist which is hard to eliminate".[239]

Bergeron's rival at the CEA, Pierre Guillaumat, certainly disagreed on most point, but not on the need for information control. His background explains this predilection. During the war, he had been part of the BCRA, the secret service of the Résistance where he "learned" secrecy and clandestinity. Historian

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235 Letter from Bergeron to the Minister for National Defense, 19th May 1953, n°43/CAB/S, Secret/Confidentiel, GR1 Q19/2, SHD.

236 Conference by General Bergeron given at the IHEDN, *op. cit.* The 75mm field gun, which proved to be a revolutionary artillery piece during World War I, had indeed been fabricated in an atmosphere of secrecy and deception to trump German espionage. Nicholas Hall, "The French 75 Mm Modèle 1897 Field Gun," *Arms & Armour* 12, no. 1 (April 2015): 10.

237 Letter from Bergeron to the Minister for National Defense, 29th March 1954, n°31/CAB/S, Secret/Confidentiel, GR1 Q19/2, SHD.

238 Note "Le Commissariat à l'Energie Atomique (C.E.A)", 9th March 1954, Très Confidentiel, GR 1 Q19/2, SHD.

239 Note from the General Bergeron, "Note sur les études militaires atomiques", 10th January 1954, Secret/Confidentiel, GR1 Q19/2, SHD.

Jean Damien Pô argues that this experience likely influenced him, and many other key decisionmakers of his generation, in their choice to pursue a clandestine program. Secrecy, simply put, was part of the "culture" of this small group of men who ended up in important position inside the French state.[240] This experience apparently convinced him that "actions taken behind the scenes [were] often more effective than those taken on stage".[241] He was also convinced of the entire futility of involving the public opinion in such debates. As he declared years later, "public opinion, when consulted, takes whatever position. The only thing that matter is the opinion of the regular government".[242] Guillaumat despised public opinion, as he considered the public unable to "truly vote for the long term". He did not care much for parliamentary debates either, or as he declared in a 1986 interview about the nuclear program: "What is the use for parliamentary discussion?". He added; "In Hell, there is public opinion, elsewhere, I have never seen it".[243] His opinion was fixed very early on, before the military program actually had started: secrecy was necessary, particularly to "avoid the illusion (on the right) and the anger (on the left) which might arouse from the announcement of research for military application."[244] Secrecy for the former *résistant* simply was simply a given, and not a particular problem. Like Bergeron, he used the 75mm field gun development as an example: "for years, we hid that some credits were employed to the study of a field gun with a hydraulic brake which was particularly smart. Secrets things are also being done in peacetime."[245]

Guillaumat answered Bergeron's criticism by defending the CEA's ability to control information about its research. He argued that "the 8 years it has existed, he had not known of any leak attributed to the CEA", contrary to the Military, whose issues with secrecy were frequent.[246] His task in defending the CEA's case for weapon production was, in fact, facilitated by a leak. In July 1954, the *affaire des fuites* (the leaks affair) shook the Mendès-France government: for months, someone had been leaking the

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[240] Pô, "La DAM Du CEA," 78.
[241] Christan Stoffaës, "Foreword" in Georges-Henri Soutou and Alain Beltran, eds., *Pierre Guillaumat, La Passion Des Grands Projets Industriels. Actes Du Colloque Du 18 Janvier 1994.* (Paris: Editions Rive droite, 1995), xxiv.
[242] Interview with Pierre Guillaumat, 551AP/13, AN, vol.II, Interview I, 3rd June 1987, 3.
[243] "Interview de Pierre Guillaumat, Par Mycle Schneider et Georg Blume," *Damoclès*, no. 67 (1995).
[244] Note from Pierre Guillaumat, 8th December 1952, cited in Pô, "La DAM Du CEA," 63.
[245] "Interview de Pierre Guillaumat, Par Mycle Schneider et Georg Blume."
[246] Pô, "La DAM Du CEA," 49.

proceeding from the Superior Commission for National Defense to the Communist Party.[247] The subsequent investigation led to the sacking of Jean Mons, then secretary for the Army, who was replaced by the General Jean Crépin, who was much more favorable than Bergeron's to Guillaumat's case. Both had been Polytechnic student and shared a long-time friendship. Crépin would end up at the head of the Committee for Nuclear Explosive, where he decided on the CEA as the leader of the military nuclear program. His choice was not justified solely by his affection for Guillaumat: he also was convinced that atomic research, both civil and military, should be under a unique leadership.[248] The last obstacle on Guillaumat's road was removed when Gaston Palewski, minister for Atomic affairs in the short-lived Edgar Faure government, replaced Bergeron at the head of the CASDN with Crépin.[249]

The third key actor, Pierre Mendès-France, was also committed to secrecy, essentially for political reasons. The French political leadership was fully aware that public opinion was not in favor of a nuclear program. When Pleven had ordered a first study of a possible French nuclear program, he already instructed the military to be discreet as the National Assembly then contained many anti-nuclear advocates.[250] The fear that, if it became public, the French nuclear program might cause the government's fall was a key driver of Mendès-France behavior. When he convened a meeting to discuss these questions in November 1954, a few weeks before making his decision, he officially did so to discuss the Algerian question. He asked his secretary of the Navy Henri Cavaillet to study the possibility of hiding the bomb's budget under the cover of ongoing research for the nuclear submarine. According to Jacques Hymans, who interviewed Cavaillet at length, such secrecy was justified by the conviction that "if public opinion learned of these preparations the government would likely fall".[251] Moreover, Mendès-France, feeling a "desperation over the resurgence of Germany" likely did not want to risk seeing this program fail in front of the Parliament.[252] As such, secrecy was justified mainly to avoid

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[247] Douglas Johnson, "L'affaire Des Fuites," *Modern & Contemporary France* 1, no. 2 (January 1993): 151–60.
[248] Jean Crépin, "Histoire Du Comité Des Explosifs Nucléaires," in *L'Aventure de La Bombe. De Gaulle et La Dissuasion Nucléaire.*, ed. Institut Charles de Gaulle and Université de Franche-Comté (Paris: Plon, 1985), 78–80.
[249] Interview with Pierre Guillaumat, 551AP/13, AN, vol.II, Interview I, 3rd June 1987, 4.
[250] Crépin, "Histoire Du Comité Des Explosifs Nucléaires," 78.
[251] Hymans, *The Psychology of Nuclear Proliferation*, 103.
[252] Hymans, 108.

domestic debates. Ironically enough, such preparations did briefly become public. The 26 December meeting was held in the utmost secrecy. On the day just after the meeting, Mendès-France circulated to his ministers and secretaries of state a note on the needs to reinforce their vigilance against espionage.[253] Yet, the news leaked to the press the day after – Mendès-France ordered an investigation into the identity of the leak, without result.[254] For unrelated reasons the Mendès-France fell only a few weeks after. Secrecy, like the nuclear program, would however continue.

How can one make sense of the development of French nuclear secrecy? First of all, security implications were of concern for the actors, even those reluctant to secrecy. Joliot and Dautry did not reject the idea of secrecy over some research, but objected to the suggestion that their work, oriented toward industrial uses, should be secret. To them, it seemed possible to draw a clear line between safe and dangerous knowledges. Nevertheless, they accepted that some things, inside the CEA, should stay secret. In fact, they also agreed to personnel control early on, though in a very "weak" form.[255] In debates with the CEA's critics were debates on the scope of secrecy, more than debates on its necessity which was accepted by both. CEA officials, in any case, were quite alone: MPs, governmental and security officials desired more secrecy. Simply, the very autonomous form of the CEA did not really allow them to impose their desires over actors. The behavior of Joliot and Dautry, I argue, fits with the idea that secrecy was the result of structural constraints: alternative course of actions was imaginable but made costly by the environment in which actors made decisions. In the end, Joliot had to go. It is significant that most of the criticisms against him was framed in terms of the security implications of secrecy. When French officials explicitly sought to acquire nuclear weapons, secrecy was not a question: it was simply an imperative, as Bergeron put it.

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[253] There is no evidence that it is directly linked to the meeting. However, it indicates that Mendès-France, at this moment, was particularly conscious of the need to reinforce information control inside his government and the state more generally. Letter from the Prime Minister to all ministers and secretaries of state, "Transmission aux Services de Surveillance du Territoire des informations intéressant la lutte contre l'espionnage", 27th December 1954, Confidential, n°7385SG, F60/305, AN

[254] To this day, we still do not know who was the leak. Bendjebbar, *Histoire Secrète de La Bombe Atomique Française*, 188.

[255] See next chapter for a discussion of French personal control practices.

US hegemony, in the French case, seemingly had much less effects than in the two other cases. It constituted a rhetorical resources for proponents of secrecy, and certainly influenced officials in some ways, but generally speaking it did not change the course of policy. This makes sense, because the mechanism through which it had effects was linked to the actors' desire not to lose the prospect of cooperation in the nuclear domain. Such prospects were not entertained particularly strongly by CEA officials. Therefore, though it made things more difficult, it was less important. Of course, these calls for more secrecy were not detached from concerns about domestic contestation of the nuclear program. It seems that all actors agreed that the program should be kept secret because its revelation might cause its failure. If actors were somehow constrained to impose some sort of information control over nuclear knowledges, they were not constrained *at all* to go as far down the secrecy road. They did so because it was in their interest. Here, as in the UK case, it was entirely up to them.

5. Conclusion

This chapter has shown how a combination of external constraints and domestic choices constituted the rationales for the creation of nuclear secrecy regimes in postwar democratic states. The first of these constraints was the security implications of nuclear knowledges. Following the invention of nuclear weapons, and in the absence of restraints against their use, the knowledges necessary to build them became security concerns. As a result, state actors had little choice but to create regimes to control their spread and reduce the potential vulnerabilities they could create. This point supports my claim that nuclear technology participated in the making of new state structures. After actors decided to engage in nuclear research, they were constrained to create regimes of information control in order to tame the exceptional danger of the nuclear age. This chapter has shown how the intrinsic properties of nuclear knowledges led actors to introduce such regimes. This happened even in France, which constituted a typical case of actors trying to resist the structural constraint toward nuclear secrecy. But Joliot himself admitted that military knowledges required secrecy and implied the only scenario in which France could keep lax secrecy restrictions is one where it does not try to acquire nuclear weapons. Once embarked on a weapons program, secrecy was inevitable.

The scope of this secrecy regime was however not entirely determined by technology. Those boundaries were also defined by external actors, notably as a result of pressures coming from the US hegemon. British and Swedish decisionmakers, when working toward nuclear weapons, sought to maintain the possibility of cooperation with the US, whose diplomats considered secrecy to be essential. US hegemony constituted a second constraint. Even France felt the effects of hegemony though it had not strong desire for in nuclear cooperation with the US at this point, as US demands for secrecy influenced French debates. The US influence over British, Swedish and French policy though here studied only in the context of a limited time period would continue and vary in strength – particularly after the Atoms for peace program in 1953.[256] But it would be wrong to think only in terms of constraints. The structural constraints of technology, paradoxically, also offered possibilities, notably the possibility of rationalizing one's choice of secrecy as an inevitable by-product, rather than as a desire to escape domestic political control. The glare of exceptionality which surrounded nuclear weapons allowed actors to try to benefit from more autonomy. This was entirely an actors' choice. Nothing prevented them from publicly announcing their intent to engage in a nuclear program. At the same time, the strict control over information related to the content of the policy meant that hiding the purpose of the policy was a viable option for actors unwilling to undergo the chore of democratic deliberation.

This chapter, and the one before it, aimed at making the case for the agentic capacity of technology as the primary causes of the emergence of nuclear secrecy regime. They argued that the intrinsic properties of nuclear weapons, in the specific historical context in which they emerged – and in which we still live –, created constraints over actors and induced changes in the structures of those states who sought to acquire nuclear weapons. Against technological determinism, I have argued that technology was not the only cause of secrecy, and that it cannot fully explain the scope of information control regime. Nevertheless, it was a necessary factor in the development of nuclear secrecy regime. The decision to pursue nuclear weapons did lead to the nuclearization of the state. Two interrelated questions need now to be investigated. As I have provided evidence for the causal role of technology in the constitution of

[256] This will be discussed more in the following chapter, and in a working paper entitled "A global order of secrecy? US hegemony and the making of nuclear secrecy regimes in European states (France, Sweden, the UK – 1946-1967)" and presented at the LSE-Sciences Po International History Seminar in October 2022.

nuclear secrecy regime, I now must show how those regimes were constituted, and how they evolved over time – what *kind* of state structures did nuclearization produce? Most importantly, I still need to provide evidence for the claim that those regimes had any effect on modes of democratic control. Those questions will be the object of the next two chapters.

Chapter 4. Escaping Parliaments' gaze.

Nuclear secrecy as a restriction to legislative control.

One of the most obvious effects of secrecy is that it conceals things. In doing so, it allows actors to escape external control. In a democratic state, it is considered normal, in fact necessary, that citizens control the state's actions.[1] Secrecy regimes can become barriers to control by preventing public knowledge of particular programs, flawing information about certain them, or distorting the truth to serve elites' preferences, instead of the elected representatives'. The previous chapter argued that the emergence of nuclear secrecy was a consequence of a state's decision to engage in nuclear weapons research. It remains to be determined whether these regimes affect democratic government. This chapter therefore asks: how did these nuclear secrecy regimes affect democratic control over nuclear policymaking?

It argues that nuclear secrecy regimes create several mechanisms – exclusion, distortion, and denial – which crippled parliaments' ability to effectively control nuclear policy. Because of the strong compartmentalization of knowledge related to nuclear policy, MPs could not access sufficient information either to make proper choices or to assess the executive's choices. These mechanisms operate differently over different periods and at different levels. However, the main point is that the exceptional regime of secrecy that surrounds nuclear knowledges create a "black spot" in the fabric of the state, which escapes democratic control. That Parliaments lack effective control over nuclear policymaking is particularly significant because it is the only counterweight to an all-powerful executive in the domain, since judicial power has little control power over nuclear policy.

This chapter follows the thread articulated in the previous chapter, according to which nuclear secrecy is not to be understood as a dichotomous regime, but as a continuous one, from technical to political secrecy. It shows that the way secrecy was organized to protect technical secrets led to a strongly exclusionary regime in which only insiders could get access to knowledges about nuclear policy.

[1] On control as a necessary condition for democratic government, please see chapter 1.

Although personnel control regimes, for instance, may seem only remotely related to legislative control, they constitute mechanisms through which certain actors are excluded from the circle of those in the know, and therefore rendered dependent on the "select few" for information.

Before going into the details of the cases, a few things must be clarified. First, I focus here on democratic control over policy choices. This control is not exerted directly by citizens but by a body of elected representatives vested with legislative power to make state officials act according to their preference through various mechanisms aiming to ensure that the delegation of power to the executive does not become a blank cheque. Therefore, this chapter focuses specifically on legislative control over nuclear policy. To define "nuclear policy", I choose to follow Eric Mlyn's three-level model of nuclear policy, with small twists.[2] Nuclear policy is composed of the *declaratory* policy level – the publicly stated goals regarding the purpose of the nuclear arsenal – the *development force* policy level – the procurement and development choices related to the arsenal – and the *action* policy level – the plans for deployment and uses of the nuclear arsenal. Differentiating between these different levels allows for a more precise evaluation of the effects of secrecy on legislative control as this control can be differently affected at different levels.

This chapter is based on different sources. For the British case, it draws from the existing literature as well as from the wealth of available archives from the Prime Minister the Cabinet offices. It also uses archives from the Atomic Weapons Research Establishment, notably regarding its personnel control practices. For the French case, secondary sources are relatively scarce when it comes to secrecy. The CEA archives being unavailable to me, I chose to rely on archives from the de Gaulle presidency and the ministry of Defense, but also from the ministry of Justice, the ministry of Homeland security and the *Cour des comptes*, France's budgetary oversight institution. Using those rarely consulted sources, I propose the first history of the CEA internal security service, as well as a new look at the organization of nuclear secrecy in France between 1954 and 1974. For the Swedish case, I used the archives from FOA, as well as archives from the security services, parliamentary commissions, high-ranking military

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[2] Eric Mlyn, *The State, Society, and Limited Nuclear War*, (Albany: State University of New York Press, 1995), 2.

officers and the private archives of Prime minister Erlander. As in the French case, I propose the first history of the Swedish nuclear secrecy regime, whose development has not been covered by existing studies on the Swedish nuclear program.

This chapter is organized according to the following structure: after discussing the mechanisms through which secrecy can affect legislative control, I look at each of the case studies at different periods of their nuclearization – the clandestine period, when secrecy over nuclear policy was almost total, and the legal period, when Parliament could be somewhat involved in the making of nuclear policy choices. For each period, I determine the general shape of the nuclear secrecy regime and its drivers, and then look at how it affected the ability of the parliament to control the different levels of nuclear policymaking through mechanisms of exclusion, distortion, or denial.

1. Secrecy as a restriction to legislative control

As argued in chapter 1, what makes decision-making democratic is not its outcomes but whether such outcomes were reached through procedures that satisfy criteria of democratic-ness. It is in that regard that secrecy must be examined. The account given in this chapter is consequently a constitutive and not a causal one.[3] It looks at whether the principal-agent relationship was constituted in such a way that the principal (parliaments) could exert effective control over state officials (the agent) or not. It seeks not to establish secrecy as the cause of certain policy outcomes but instead argues that regimes of nuclear secrecy restricted the ability of Parliaments to effectively control nuclear policymaking. Instead of measuring the effects of secrecy, it aims rather at identifying mechanisms through which information was made unavailable to members of parliament, thus limiting their ability to properly assess the scope of policy choices and their implications. Based on the table proposed in the first chapter, I find the various modes of control over nuclear policymaking to be effective under the following conditions:

[3] Alexander Wendt differentiates between causal (in a positivist sense) account and constitutive ones, the former seeking to provide causal explanation of certain phenomenon, and the latter aiming to "show how the properties of a system are constituted". Alexander Wendt, "On Constitution and Causation in International Relations," *Review of International Studies* 24 (December 1998): 104–5.

Modes of control	Conditions for effective democratic control
Deliberation	Ability to participate in the making of policy and to obtain accurate information about the justifications and costs or implications of proposed policies.
Oversight	Ability to participate in oversight and obtain accurate information about the ongoing implementation of policies.
Accountability	Ability to obtain *a posteriori* accurate information about policies, and their correspondence with given justification and announced costs.

Table 2 - Conditions for democratic control over nuclear policy

Consequently, even in a case in which it could be demonstrated that a similar outcome would have been reached if MPs had full information I would argue that the democratic issue would not have been solved. Therefore, what we should look at are the mechanisms through which secrecy regimes affect parliamentary control. Three main mechanisms can be identified: exclusion, distortion, and denial.

a. Exclusion

Exclusion refers to the eviction of Parliaments from specific instances of decision-making as a result of the segregating effects of secrecy regimes. Exclusion is not simply about preventing parliaments from knowing about a policy, but also preventing their very involvement. Practices of information control are supposed to enforce the principle that some people may access certain information while some may not. Secrecy, in that regard, is a segregative practice. Georg Simmel argued that shared secrecy among members of a group created a “relation of exclusion toward the uninitiated”.[4] As Costas and Grey put it, “secrecy serves to create important boundaries upon which social life is based”, mapping out relations between actors by erecting “walls” and “defin[ing] the corridors between rooms through which secrets may legitimately pass”.[5] It determines who gets to be part of the group present and active in specific instances of decision-making, and consequently whose interests will be represented at the moment of

[4] Georg Simmel, “The Sociology of Secrecy and of Secret Societies,” *American Journal of Sociology* 11, no. 4 (January 1906): 470.
[5] Jana Costas and Christopher Grey, *Secrecy at Work: The Hidden Architecture of Organizational Life* (Stanford, California: Stanford University Press, 2016), 30, 70.

decision. To maintain this distinction, certain things are being concealed from other actors, to exclude them fully. Things might be presented dishonestly, so as not to reveal the true purpose of certain budgets, or sites. This is the first mechanism through which secrecy affects legislative control: it implies an absence of deliberation over policy choices. In effect, it removes certain objects from legislative control.

b. Distortion

The second mechanism is what I call *distortion*. It refers to situations in which the principal simply does not have the information required to properly assess the agent's actions because of the secrecy regime.[6] In that case, secrecy does not prevent control *per se*, as the parliament is involved, but prevents effective control as MPs would, for example, be voting on texts which do not correspond to the reality of projected policy. Distortion can be the result of two kinds of practices. It can be strategic, referring to cases when actors intentionally conceal certain information to remove a certain object from control, and in this case, I will speak of *obfuscation*. Obfuscation implies a "practice of deliberate intervention, which can involve tampering with documents and spreading misinformation that obfuscates truth".[7] For example, state officials can take deliberate steps to distort the existence of their program by obfuscating its budgetary cost or using secret sites and clandestine methods. But distortion can also be unintentional. In that case, Cuenca and Siddiqi speak of "*omission*" which simply refers to the "withholding of information", an "act (…) which rearranges the relationship between a body of knowledge and its possession by certain parties".[8] In that case, distortion occurs, but without specific intent to mislead the agent. Rather, it comes as the normal by-product of information control regimes, or out of path dependency. Omission lacks a political intent to deceive, and this is what fundamentally differentiates it from obfuscation.[9] Though

[6] In that sense, it differs from mere ignorance, when the principal ignores something not because information is hidden but because he has not sought it.
[7] This typology is drawn from Esther Liberman Cuenca and Asif A. Siddiqi, "Bureaucratic Secrecy and the Regulation of Knowledge in Europe over the *Longue Durée:* Obfuscation, Omission, Performance, and Policing," *Continuity and Change* 38, no. 1 (May 2023): 3–4.
[8] Cuenca and Siddiqi, 3.
[9] In that sense, it is similar to what Diane Vaughan called "structural secrecy" and defined as "the way that patterns of information, organizational structure, processes, and transactions, and the structure of regulatory relations systematically undermine the attempt to know and interpret situations in all organizations." Diane Vaughan, *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA* (Chicago: University of Chicago Press, 1996), 286.

distortion does not prevent control, as exclusion does, it flaws modes of control by restricting access to information. It can lead the parliament to act only as a rubber stamp.

c. <u>Denial</u>

The third mechanism is what I term *denial*. It operates when information is available about a certain issue, actors are *aware* of it but struggle to *acknowledge* it, avoiding it until someone "breaks the silence" and articulates all the pieces of information to form knowledge.[10] Therefore, though nothing formally excludes them from discussing the issue, social constraints impose themselves on actors and facilitate silence over certain issues, leading to denial. Control is not impossible, as with exclusion, but it is circumvented because of informal rules which define a certain issue as being out of the public debate or belonging only to the executive. The first two mechanisms correspond to what Koen Vermeir calls the "privative view of secrecy", where the main effects of secrecy are to be assessed regarding information (un)availability.[11] But in practice, the secret does not always equate with the invisible, as Taussig's anthropological study on "public secrets" has shown sometimes matters remain secret because actors "know what not to know" – and when they do not, social structures remind them.[12] Secrecy operates more diffusely, by implying that some matters should not be investigated, and some things are better left unknown. Denial creates an informal exclusion, which can take several forms. It can lead actors not to mention certain topics out of fear of its "taboo" nature, in the absence of formal censorship mechanisms. It can also reinforce the segregation between those who are privy to secret information and those who are not, at the expense of the latter. For example, studies have shown that actors tend to lend more credibility to classified than non-classified information, even when their substance is similar.[13] As

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[10] The distinction between awareness and acknowledgment comes from Eviatar Zerubavel's sociology of silence. See Eviatar Zerubavel, *The Elephant in the Room: Silence and Denial in Everyday Life* (Oxford ; New York: Oxford University Press, 2006). chap. 5.
[11] Koen Vermeir, "Openness versus Secrecy? Historical and Historiographical Remarks," *The British Journal for the History of Science* 45, no. 2 (June 2012): 171.
[12] Taussig, *Defacement*, 3. Alastair Roberts also speaks of "open secrets" to refer to "generally known facts about which [the public] purported to be ignorant". Alastair Roberts, "Open Secrets and Dirty Hands," in *The Secrets of Law*, ed. Austin Sarat, Lawrence Douglas, and Martha Merrill Umphrey (Stanford: Stanford University Press, 2012), 26.
[13] Tore Pedersen and Pia Therese Jansen, "Seduced by Secrecy – Perplexed by Complexity: Effects of Secret vs Open-Source on Intelligence Credibility and Analytic Confidence," *Intelligence and National Security* 34, no. 6 (September 19, 2019): 881–98.

a result, those in possession of "secrets" sit higher in the "hierarchy of credibility", and their claims carry more weight than others'.[14] This produces feedback effects, as secrecy regimes are reinforced by mechanisms of circumvention, and actors then have less incentive to challenge secrecy.

To summarize this first section: legislative control constitutes a necessary condition for democratic government, and secrecy regimes can stand in the way of its effective exercise by preventing parliamentary engagement or restricting the amount of available information. Three mechanisms can produce such outcomes: exclusion, distortion, and denial. In the presence of even one of these, legislative control is hampered. In the next section, I will look into the three case-study and show how nuclear secrecy regimes systematically produce such an outcome, though in various shapes and forms.

2. Legislative control during the clandestine period: an absent Parliament

As discussed in the previous chapter, when state officials decided to embark on a nuclear program, they also decided to hide its existence from public view, never officially acknowledging it or its progress. In other words, though not illegal *per se*, the nuclear program was clandestine. For some years, in the UK, Sweden, and France, what remained secret was not solely the outcomes of the official nuclear policy, but the fact that such a policy existed. It was never voted on and advanced under the cover of darkness. After a while, the subject was evasively discussed, but the progress and status of those activities remained unknown.

It was in that period that the nuclear secrecy regime emerged in those three states. It aimed not only to protect technical knowledges but, in fact, all knowledges about the arsenal in the making. During that time, legislative control over nuclear policy was basically non-existent and rendered impossible by the regime of secrecy in which nuclear activities were shrouded: the public was excluded from all forms of parliamentary control. Though it was possible to be aware that some kind of activity was taking place, it was impossible to know what was happening. In France and the UK, these years would turn out to be the most crucial for the nuclear program, as they would deeply entrench its existence. As such, secrecy

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[14] Didier Bigo, "Security and Immigration: Toward a Critique of the Governmentality of Unease," *Alternatives: Global, Local, Political* 27, no. 1 (February 2002): 74. On the notion of "hierarchy of credibility", see Howard Becker, "Whose Side Are We On?," *Social Problems* 14, no. 3 (Winter 1967): 242–43.

permitted nuclearization by shielding nuclear acquisition from any public debate or legislative control until it had attained a certain level of advancement.[15] In Sweden, this entrenchment did not happen. The program continued clandestinely for some years, but leadership's hesitancy regarding nuclear acquisition led to a public debate. Though this debate did not affect the secrecy regime in itself – it did not lead to revelations about the kind of activities happening in state laboratories – it constituted nuclear acquisition as an object of public debate, and of legislative control.

For this section, I define states' action policy as, basically, whether or not to acquire nuclear weapons. Force development policy corresponds to choices about *how* to acquire them. I focus here on the budgetary means dedicated to the program, and on test site selection, as an element of the force development policy. Declaratory policy is defined as whether or not to publicly admit that one is pursuing nuclear weapons. It encompasses the three levels of nuclear policy at a time when issues of strategies, targeting, and deployment are purely virtual. It must be noted that the clandestine period constitutes a paroxysmal period: at no other time during each country's nuclear history would legislative control be so low, and secrecy so high. It is nevertheless of importance, not only because this period was crucial in determining the path of each state's future nuclear policy, but because it also laid the foundations of nuclear secrecy regimes' future shape.

a. How did Attlee hide the bomb? British clandestine years (1947-1952)

In October 1951, Winston Churchill returned to 10 Downing Street. In November, he was asked to approve the choice of the Monte-Bello islands for the first nuclear test.[16]. He did not expect the nuclear program to have gone so far, and with such secrecy.[17] In February, Churchill had publicly criticized the Labour government for having failed to produce a bomb after all this time.[18] Surprised, he inquired: "How was it that the £100 million for atomic research and manufacture was provided without Parliament

[15] On secrecy as a factor of entrenchment, see William Walker, "On Nuclear Embeddedness and (Ir)Reversibility.," Working Paper (Princeton: Princeton Science and Global Security Program, 2019), 19–20.
[16] Farmelo, *Churchill's Bomb*, 381. On the Monte-Bello tests, and on nuclear testing programs more generally, see the next chapter of this dissertation.
[17] Jones, *The Official History of the UK Strategic Nuclear Deterrent, Vol.1*, 14.
[18] Gowing, *Independence and Deterrence. Vol II.*, 130–31.

being informed? How was this very large sum accounted for?”[19] Churchill was surprised that Labour had done so well in its attempt to conceal the program from public view. His close advisor, Lord Cherwell, too, was “agreeably surprised that the Socialist Government was sufficiently imaginative and patriotic to risk the parliamentary criticism to which this might expose them.”[20]

This anecdote tells of the extent to which Clement Attlee, following his 1947 decision to launch a nuclear program, sought to avoid publicity of any sort. During a little more than 4 years, the British nuclear program was shrouded in deep secrecy and no one, not even a MP like Churchill knew much of what was going on. Behind high walls of secrecy, designed first to protect the program from Soviet – and to a certain extent, US – eyes, key decisions were made outside any form of legislative control.

i. *The secrecy regime: minimal acknowledgment, extreme secrecy and extensive censorship*

In May 1947, William Penney, the man in charge of British nuclear research, was informed about Attlee’s decision to launch a nuclear program. That was several months after it was made. This gives an idea of the level of secrecy surrounding nuclear issues in 1947.[21] Henry Tizard, the scientific adviser to the Ministry of Defence, was also excluded from the decision, so much so that he declared to the Chiefs of Staff in July that no decision had been made.[22] Most members of the Cabinet were not informed about the program either.[23] It was known under the innocuous name of High Explosive Research (HER) in administrative circles, so as not to reveal its nuclear nature, and organized as a subdivision inside the Ministry of Supply (MoS).[24] All connections between Penney’s teamwork on military aspects of atomic energy and the MoS Atomic Energy Division, the civilian branch, were concealed.[25] Press visits at Harwell, the main atomic energy site, were forbidden,[26] and Attlee personally concerned himself with

[19] Letter from Winston Churchill to Sir Edward Bridges, 11th December 1951, PREM 11/297, TNA.
[20] Letter from Lord Cherwell to Winston Churchill, 21st December 1951, PREM 11/297, TNA.
[21] In fact, Penney would only learn that the decision had been taken months prior when reading the draft of Margaret Gowing’s official history of the British program in the 60s (Letter from William Penney to Margaret Gowing, 27th January 1969, ES 22/7, TNA). Cathcart argues that such secrecy was justified by the fact that Penney was the last channel of communication between the British and the Americans and informing him would have put him in a delicate position. Cathcart, *Test of Greatness*, 46.
[22] Gowing, *Independence and Deterrence. Vol I.*, 34.
[23] Gowing, 56.
[24] Cathcart, *Test of Greatness*, 24.
[25] Gowing, *Independence and Deterrence. Vol I.*, 210.
[26] Gowing, *Independence and Deterrence. Vol II.*, 127.

these matters, asking to be informed about any publicity move related to atomic energy – even something as seemingly harmless as the Atomic Train exhibition which aimed at vulgarizing the basics of atomic energy.[27] For Attlee, the absence of publicity was paramount. Consulted about publishing pictures from the Harwell plant for informative purposes, he answered: "I cannot understand this enthusiasm for publicity. (…) the Ministry of Supply gives no reason why publication is desirable, except that the Americans give more information. Do the Russians publish anything for our benefit?"[28]

For a few months, from January 1947 to May 1948, Attlee's fear of publicity was so strong as to make the program dysfunctional. The MoS raised an alert in early 1948, noting that secrecy had become "increasingly ineffective, and impediment to progress and a possible source of embarrassment or even of danger".[29] It was an impediment to progress, first, because some officers would not be given "an inkling of the real nature of the job they were asked to do" and therefore did not "understand its importance and urgency". It was a source of danger, second, because, paradoxically, total secrecy hurt information control. Without some sort of acknowledgment of the existence of nuclear weapons research, it was impossible to publish a D-notice which would have prevented a journalist from publishing a paper on the true nature of HER.[30] The decision was hence taken to admit the existence of nuclear weapons research, to obfuscate it better. To avoid attracting attention, the declaration had to be done "casually and incidentally", and not as an official announcement.[31]

This declaration took the form of a planted question in the House of Commons. On the 12th of May 1948, a Labour MP asked whether the Minister of Defence was "satisfied that adequate progress is being made in the development of the most modern types of weapon", to which the Minister answered that "research and development continue to receive the highest priority in the defence field, and all types of weapons, including atomic weapons, are being developed."[32] Such a declaration hardly qualifies as a form of acknowledgment. It did not clarify what kind of research was going on, at what scale, at what cost, or

[27] Letter from Ernest Bevin to Clement Attlee, 4th October 1947, P.M./47/138, PREM 8/1294, TNA.
[28] Minute from Clement Attlee, 29th May 1951, PREM 8/1548, TNA.
[29] Gowing, *Independence and Deterrence. Vol I.*, 210.
[30] Gowing, 211.
[31] Wilkinson, *Secrecy and the Media*, 222.
[32] Cited in Gowing, *Independence and Deterrence. Vol I.*, 212.

whether a definite decision on the desirability of a nuclear arsenal had been taken by the government. When pressed for further comments specifically on nuclear weapons, the Minister of Defence refused to answer, citing the public interest as the reason for his silence.[33] A few days later, at the annual Labour conference, Attlee referred obliquely to this, but without any acknowledgment of an official decision.[34] As historian Margaret Gowing wrote, "these few lines of print were the only information vouchsafed to the public in four years that Britain was on her way to becoming a nuclear military power".[35]

In fact, it made it much easier to keep the program secret, as it allowed for the publication of a D-Notice to censor the press and prevent media publicity on the matter. Many journalists, and particularly the defense establishment's *bête noire* Chapman Pincher, had become aware of the policy.[36] For example, in 1951, when a special facility was constructed at Aldermaston for the (secret) purpose of assembling Britain's warheads, Pincher rapidly deduced the true nature of the site from the nomination of William Penney, whose involvement in the Manhattan project was public knowledge, as its head. Yet, he would not be authorized to publish it in an article.[37] Attlee himself was fully aware that some things could not be kept secret but maintained that: "too much publicity for the Atomic Energy Works and the Ministry of Supply is undesirable" and chose to remain silent – and to impose silence on the media.[38] He even asked to be informed in advance "of any proposed announcement [related to nuclear policy] which is likely to create widespread public interest".[39]

Aside from these concerns about public discourse, the control of technical information was severely regulated. Classification and de-classification of scientific information was regulated by tri-partite

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33 Gowing, 213.
34 Thomas-Symonds, *Attlee*, 195.
35 Gowing, *Independence and Deterrence. Vol I.*, 213.
36 On Chapman Pincher, who annoyed the British state so much that his portrait stood at the entrance a military factory with the message "Warning: a Person of Evil Intent", see Christopher R. Moran, *Classified: Secrecy and the State in Modern Britain* (Cambridge: Cambridge University Press, 2013), chap. 3.
37 Gowing, *Independence and Deterrence. Vol II.*, 131, 137.
38 Minute by the Permanent Secretary of the Ministry of Supply, 3rd November 1950, Ext. 1146, AB 8/212, TNA. In a note dated from 1950, it is noted that no violations of the D-Notice 25 – which forbade the publication of information on the nuclear program – had been made, indicating how successful Attlee's policy had been at suppressing public information (Note entitled "Control of Information", undated (likely 1950), AB 8/212, TNA). British officials also tried to intimate silence to US media as well, which was refused outright by American editors (Wilkinson, *Secrecy and the Media*, 224.).
39 Letter from Clement Attlee to the Minister of Supply, 10th March 1949, M.68/49, PREM 8/1105, TNA.

conferences between the US, Canada and the UK. All three states had collaborated on the Manhattan project and agreed to consult each other on how to declassify its results. The talks were guided by a Declassification guide, which was itself classified because it gave an "over-all picture of the whole [Manhattan] project" and even mentioned "extremely secret matters".[40] Decisions about what to declassify were the product of a small set of actors, under the general patronage of the US. For the British, this created issues, as they did not share the same vision. British policymakers wanted more information to be classified than the Americans, as they believed that information that required a lot of efforts should be classified regardless of their value. At the same time, they also resented the constraint such agreements created, notably on its ability to export reactor technologies.[41] In any case, all talks were governed by a key principle, defined very early on: "All matters connected with the construction of the actual bomb are to be excluded".[42]

Classification, fundamentally, is a matter of segregating: it defines which actors can access which documents, pending their possession of certain requirements – in most cases, a security clearance. This points to the importance of personnel control practices in secrecy regimes. Concerns about personnel control emerged early on, driven by fears of communist infiltration.[43] For example, when a member of the Windscale nuclear plant personnel was identified as a communist, it was asked that he be removed "[not] because of the trouble he was making but because he was an active Communist and, as such, ought not to be employed on the site."[44] Originally, British officials wished to investigate the entire personnel of the nuclear enterprise, but shuddered in front of the workload. Only permanent MoS employees would be submitted to MI5 for clearance.[45] It was a convenient choice, but also a strategic

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[40] Letter from Alton P. Donner, US Engineer office, "Transmittal of declassification guide for responsible reviewers", undated (1946), CAB 126/211, TNA.
[41] Gowing, *Independence and Deterrence. Vol II.*, 124.
[42] Telegram from Washington to London, 5th July 1945, Top Secret, ANCAM 321, CAB 126-211, TNA.
[43] Though the official policy was to exclude Communists *and Fascists*, the focus on Communists was so obvious that some early drafts contained only reference to "Communists". Anxious to appear even-handed, civil servants rejoiced when they managed to find "fascists" in their assessment of security risks. Peter Hennessy and Gall Brownfeld, "Britain's Cold War Security Purge: The Origins of Positive Vetting," *The Historical Journal* 25, no. 4 (December 1982): 968.
[44] Letter from D.A. Shirlaw to J.A. Jaggers, "re: Mr. George Dykstra", 14th June 1949, Secret & Personal, AB 8/1172, TNA.
[45] Letter from C. Hinton to P. Sillitoe, 16th July 1948, Secret, AB 8/1172, TNA.

one: avoiding a "wholesale vet" also meant restricting the number of people given access to secret information.[46] Moreover, the director of MI5 expressed doubt at vetting procedures which "provide[d] no real protection against leakage of information through gossip and indiscretion" and "achieve[d] only a false sense of security".[47] The "false security" of the British project would be dramatically exposed less than two years after the introduction of those procedures. On February 2nd, 1950, Klaus Fuchs, head of the Theoretical Physics Division at Harwell and former Manhattan Project participant was arrested for espionage.[48] The event would shake the British and their US ally to the core.

For years, a key asset of the British nuclear establishment had been leaking secrets to the Soviets. This revealed both the extent to which British security might be compromised and affected the prospect of renewed cooperation with the US. The very day of the arrest, the British Ambassador in Washington met with Dean Acheson and briefed him on the facts of the case. Acheson, though empathetic to the British, was straightforward: this would "clearly mean that the tripartite talks about the modus vivendi would have to be slowed down if not suspended".[49] The defection from Harwell of physicist Bruno Pontecorvo, in August 1950, made yet another UK scientist into a Soviet asset and further worsened the situation.[50] In this context, the Americans suggested a tripartite conference on security to bring British (and incidentally, Canadian) regulations up to US standards.[51] The conference took place in June 1951, and it imposed on the British the need to comply with American security wishes, notably by identifying all forms of communist associations in the nuclear field.[52] This led to the introduction of "positive vetting" in the British secrecy regime. Positive vetting denotes a very thorough form of vetting for government employees, which requires a thorough investigation of their lives to detect any potential

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46 Letter from P. Sillitoe to C. Hinton, 24th June 1948, Secret, AB 8/1172, TNA.
47 Letter from P. Sillitoe to C. Hinton, 30th April 1948, Secret, AB 8/1172, TNA.
48 On the Fuchs case, see Greenspan, *Atomic Spy*.
49 Telegram from Washington to Foreign Office, 2nd February 1950, Top Secret, ANCAM 256, CAB 126/305, TNA.
50 It must be noted that the Pontecorvo case is different than Fuchs' case. Fuchs was clearly a spy, and had consistently leaked information from the Manhattan project to the Soviets. Pontecorvo's involvement in espionage is much harder to assess, and it seems rather that the significance of his defection was linked to his unique skills as a physicist. Most claims of Pontecorvo's transmitting information to the Soviets rely on the account of one defector Oleg Gordeivsky and seem to lack an archival footprint. F. E. Close, *Half Life: The Divided Life of Bruno Pontecorvo, Physicist or Spy* (New York, NY: Basic Books, 2015), xix, 131–34.
51 Gowing, *Independence and Deterrence. Vol I.*, 300.
52 Matthew Gerth, *Anti-Communism in Britain During the Early Cold War: A Very British Witch Hunt* (London: Institute of Historical Research, 2023), 88.

security concerns – as opposed to a mere check of personal records. Originally considered only for atomic energy personnel, the practice was eventually extended to "all persons holding vital posts in Government service".[53] As Peter Hennessy writes, after a while, "vetting took a life on its own" and extended beyond the nuclear field.[54]

Though primarily turned toward other constraints, these strict practices of information control were not unrelated to clandestinity: by making the content of nuclear policy exceptionally hard to access, they facilitated secrecy for the general enterprise. These exceptional practices also helped to justify even more exceptional practices aimed at fully concealing the program from public view. For example, personnel submitted to security clearance could not discuss their work publicly, and hence not reveal that they were working on matters related to atomic bombs. Clandestinity fed on security concerns and prevented legislative control.

ii. Legislative control: minimal information, minimal involvement

How did the secrecy regime affect Parliament's ability to control nuclear policy? It entailed a far-reaching exclusion of Parliament from any kind of nuclear decision-making, which remained confined to the select Gen. 163 committee - even the full cabinet was excluded from most decisions.[55] The parliament was not consulted on any decision regarding action policy – whether to acquire nuclear weapons. Even when "informed" through a planted question, it was not allowed to debate the issue. This is true not only of the decision to acquire nuclear weapons, but also of debates over nuclear strategic conceptions, and force-sizing, all of which took place behind closed doors.

Nuclear acquisition was clearly concealed from the parliament, and opportunities for oversight over force development policy were suppressed. Budget requests for the nuclear program were organized in such a way that parliament was unable to obtain a proper image of the state's efforts – hence Churchill's question: how did Labour do so well at hiding a £100m expenditure? The answer is that officials chose to allocate funds for atomic energy – civil and military – as part of the general expenditure of the

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[53] Hennessy and Brownfeld, "Britain's Cold War Security Purge: The Origins of Positive Vetting," 969–70.
[54] Hennessy, *The Secret State*, 101.
[55] Gowing, *Independence and Deterrence. Vol I.*, 19.

Ministry of Supply "and that this vote does not show how much on research is for atomic energy, how much for aircraft and how much for guided missiles, etc…". Senior officials were allowed to divulge some numbers to the parliamentary committee on Estimates, but on the conditions that they did so orally, accounting only for the total figure of atomic energy research, and not to extend the discussion to "particularly secret subjects".[56] When MPs dared asking questions, they were met with silence "as if [they] had asked about something indecent".[57] At most, actors knew that *something* was happening inside state laboratories, although which laboratories exactly remained uncertain. Though Harwell, the main British nuclear establishment, was publicly known, this was not the case for other sites. Fort Halstead, where High Explosives Research was first located, was not even identified on maps.[58]

These efforts were part of a more general program to maintain secrecy over nuclear research and were motivated as much by domestic concerns as they were by diplomatic and security ones. Illustrative of the overlap of these concerns is Cherwell's support for Attlee's secrecy scheme. For him, revealing the actual expenditures would only "give away something to the Russians while it would not impress the Americans". Churchill commented: "There are also the British. But I agree to the answer."[59] The Russians and the Americans were high on the list of British concerns when it came to secrecy. Though strategic concerns informed the British position toward the Russians, status concerns seemed to have justified the decision to keep expenditures secret even to the Americans, as the MoD expressed objections to the idea of declassifying them "on the grounds that our expenditure on atomic energy is not big enough to be impressive."[60]

The parliament was consulted neither on the decision to acquire nuclear weapons, nor on other important decisions, notably regarding nuclear testing on Australian territory. This decision was made after some

[56] Note for the Prime Minister, "Atomic Energy Expenditure", 12th December 1951, Top Secret, PREM 11/297, TNA.
[57] Gowing, *Independence and Deterrence. Vol I.*, 52.
[58] Cathcart, *Test of Greatness*, 65.
[59] Gowing, *Independence and Deterrence. Vol I.*, 406.
[60] Letter from C.A.L Cliffe to the Prime Minister, "Ministerial Committee on Atomic Energy", 15th December 1950, Secret, PREM 8/1294, TNA.

hesitation and suggestions of alternative locations at existing US test sites or going to Canada.[61] Secrecy was well-kept on both the British and the Australian side. Only three members of the Australian government were in the loop.[62] Before the Australian Parliament, the Ministry of Supply denied allegations about future British tests in Australia twice, describing reports as "completely false" and "without foundation".[63] It was not out of dishonesty but of ignorance: Australia's own minister of Supply had not been informed of the ongoing project.[64] As he made those declarations, a site had already been studied secretly. A scouting mission had studied the Monte-Bello islands, on the northwestern coast of Australia. To the public, it was presented as a study on the "feasibility of extending the UK rocket testing project", and only "a very limited number" of Australian servicemen and officials were briefed. The Monte-Bello islands were not even called by their name, but by the term "Western Islands".[65] When the British High Commission in Canberra was contacted on the topic, it was told the topic was "a matter of such secrecy that special security precautions should be taken in your office for dealing with it".[66] By the end of November 1950. Monte-Bello was chosen, and construction started. In August 1951, rumors of preparations for a British test in Australia were published by the foreign press, creating an awkward situation for public servants who nevertheless decided that "no public statement should be made at this stage".[67] The official announcement that Britain was about to test nuclear weapons in Australia came only in February 1952. None of the diplomatic discussions were officially reported to Parliament, and neither were the expenses for the project.[68]

During the clandestine period, secrecy fully excluded the parliament from controlling policy choices. This also meant that it was entirely excluded from making declaratory policy, since the whole idea was

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[61] Lorna Arnold and Mark Smith, *Britain, Australia and the Bomb: The Nuclear Tests and Their Aftermath* (Basingstoke: Palgrave Macmillan, 2006), 17–18; John Clearwater and David O'Brien, "O Lucky Canada," *Bulletin of the Atomic Scientists* 59, no. 4 (July 2003): 60–65.
[62] "Report from the Royal Commission into British Nuclear Tests in Australia. Volume I" (Canberra: Government Printer, 1986), 447.
[63] Answer by the Minister of Supply in front of the Australian House of Commons, 29th June 1951, Official Hansard n°22, 1951, 718.
[64] Elizabeth Tynan, *Atomic Thunder: The Maralinga Story* (Sydney: NewSouth Publishing, 2016), 87.
[65] Tynan, 79; "Report from the Royal Commission into British Nuclear Tests in Australia. Volume II" (Canberra: Government Printer, 1986), 446.
[66] Cathcart, *Test of Greatness*, 150.
[67] Letter to the Ministry of Defence, 24th July 1951, Top Secret, PREM 8/1551, TNA.
[68] The first discussion on the issue at the House of Commons was on February 21, 1952, HC Hansard, vol. 496, 47.

that no declaration would be made. The program's information control regime, which implied strict secrecy over most of the work, made it extremely difficult for anyone to acquire information over a policy which was barely acknowledged by the executive. The general taboo-like behavior surrounding those topics, and the total unwillingness of the government to communicate on the topic created an informal barrier between it and the parliament. As is discussed in the next sub-section, it was the case for France too during its clandestine period.

b. A program in denial: France's clandestine period (1954-1958)

For four years, following the 26th of December 1954 secret meeting in which Mendès-France took a stance in favor of nuclear weapons, a clandestine nuclear program was ongoing in France, unbeknownst to the public or the parliament – or, at least, unacknowledged in their presence. Clandestinity, that is the refusal of any official acknowledgment of those activities, was the keyword of French nuclear policy and like in the UK, it defined the early nuclear secrecy regime. As a result, legislative control was simply impossible, and the executive operated on its own. What is more, the executive refused to exert any control over administrative actors, leaving the program ongoing while turning a blind eye.

i. The secrecy regime: a fully clandestine program

The absence of an official decision comparable to Attlee's makes the French story more difficult to follow. What is certain is that the first step toward a military program was taken in January 1955, with the creation of the *Bureau d'Etudes Generales* (Bureau for General Studies, BEG) inside the CEA.[69] The creation of the vaguely named subdivision was announced by an internal memo which simply mentioned that the BEG would be concerned with "all economic and financial studies linked to the uses of atomic energy" and mainly oversee "the execution of liaisons with certain external laboratories or group of laboratories".[70] But it would not: its actual goal was the production of nuclear weapons. For four years, the public would not be told about it.

[69] Pô, "La DAM Du CEA," 87.
[70] Mongin, "La Genèse de l'armement Nucléaire Français. 1945-1958.," 378.

Only a few weeks after the BEG's creation, Mendès-France's government fell. His replacement, Edgar Faure, discussed his intention to "do something" in favor of the military program as soon as he entered office,[71] and in March 1954, he publicly declared that France should consider making nuclear weapons. Pleven even announced to Parliament that the Government will consider asking for funds for nuclear weapons development next year.[72] But the Prime minister's public position shifted quickly. In April, he said that although "it is necessary for France to become an atomic power (…) we have decided to eliminate research devoted to specifically military uses".[73] Had he changed his mind? More likely, he was playing on words by stating that France would not pursue research devoted *specifically* to military uses. Research that concerned both possible ends were not to be eliminated. Consequently, there was no need for a specific decision until France would meet a fork in the road in 1958.[74] Arguably, the research done at the BEG could be of interest for the civilian program as well and did not have a specific military character *at the time*. But still, it was funded by the military. Moreover, in the meantime, two important meetings of the Defense Committee – a select committee on defense policy whose deliberations are secret – took place. A preparatory memo for these meetings not only laid out a production plan for nuclear weapons – at a pace of 4 weapons per year – it also specified that the program should stay secret for at least two years.[75]

Very early on, clandestinity was the policy of choice and defined public discourse on nuclear policy. In May 1955, deputy minister for National Defence Gaston Palewski proposed – with Edgar Faure's approval – to modify the five-year plan voted on in 1952 to focus on three main proposals: the building of a new pile at Marcoule (G3) to augment French plutonium production, the construction of a prototype for a nuclear-powered submarine, and a doubling of the funds allocated to the CEA in 1952. This meant

[71] Albert Buchalet, "Les Premières Étapes (1955-1960)," in *L'Aventure de La Bombe. De Gaulle et La Dissuasion Nucléaire.*, ed. Institut Charles de Gaulle and Université de Franche-Comté (Paris: Plon, 1985), 44.
[72] Fabien Cardoni, *Le futur empêché: une histoire financière de la défense en France, 1945-1974* (Paris: Éditions de la Sorbonne, 2022), 30.
[73] Scheinman, *Atomic Energy Policy in France under the Fourth Republic*, 118.
[74] Faure himself later declared that it was his conception of this issue: "I had received the assurance that ongoing studies and research could be pursued with two ends during a certain period". Edgar Faure, "Témoignage" in Université de Franche-Comté and Institut Charles de Gaulle, eds., *L'aventure de La Bombe : De Gaulle et La Dissuasion Nucléaire (1958 - 1969)* (Paris: Plon, 1985), 87.
[75] Mongin, "La Genèse de l'armement Nucléaire Français. 1945-1958.," 397.

laying substantial groundwork for nuclear weapons production.[76] The plan did not mention atomic weapons research. Palewski simply stated that what mattered was to acquire an atomic infrastructure, "then, necessity will judge".[77] At the same time, Faure announced that France was renouncing nuclear weapons, even though the G3 pile was constructed at the military's behest.[78] By 1955, it was clear that France had a nuclear program, though no official decision had been taken, creating an opportunity for plausible deniability. In a secret note, Gaston Palewski presented what might be the most honest description of the governmental perspective on the nuclear program:

> Any definitive decision has been adjourned to the date (1958) at which we will have enough plutonium for a decision to be reasonably made to be reasonably taken. Nevertheless, the government does not prevent itself from doing any research to prepare us for this date. Consequently, the necessary personnel have been recruited, the installations have been created, and research has begun.[79]

In January 1956, the head of government changed – again. Entered Guy Mollet, a Prime Minister with little interest in a French nuclear weapon – again. And yet, he pursued the policy, behind a veil of secrecy – again. On January 31, 1956, a day before his inauguration, Guy Mollet made a clear declaration: there would not be a European nuclear weapon, and France was unable to produce it alone.[80] Consequently, one would deduce that there would be no French nuclear weapons. However, Guy Mollet was informed about the existing nuclear program soon afterward. According to Jacques Chaban-Delmas, who was a minister in Mollet's cabinet and the one in charge of informing him, Mollet had to be convinced that a nuclear program was worth pursuing something he accepted one condition: "the most absolute secrecy".[81]

Research was already taking place at fully secret sites. In July 1955, it was decided that the BEG would establish its offices in a castle belonging to physicist Yves Rocard, located in Bruyères-le-Châtel. In 1954, Rocard had benefited from funds from the SDECE – the French intelligence services – to buy a

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[76] A plan exactly similar in substance had been drafted by Guillaumat in February and Gaillard, essentially, was following the CEA's lead. Interview with Pierre Guillaumat, 551AP/13, AN, vol.II, Interview I, 3rd June 1987, 6-7.
[77] Scheinman, *Atomic Energy Policy in France under the Fourth Republic*, 122.
[78] Mongin, "La Genèse de l'armement Nucléaire Français. 1945-1958.," 399.
[79] Note from Gaston Palewski, 21st January 1956, GR1 Q19/2, SHD
[80] Bendjebbar, *Histoire Secrète de La Bombe Atomique Française*, 210.
[81] Jacques Chaban-Delmas, *Mémoires Pour Demain* (Paris: Flammarion, 1997), 285.

small property to host a little company named Radio-Mana, charged with monitoring nuclear testing around the world. This constituted a perfect cover for the BEG. Radio-Mana became, from then on, the "legal personality" for the CEA's clandestine research. Contracts passed for the BEG would use the company's name.[82] To add another layer of secrecy, the site was internally referred to as Bouchet III, the Bouchet I and II sites being other CEA premises in the same region: "Aside from some insiders, everybody would believe, until 1958, that [Bruyères-le-Chatel] was an extension of that [civilian research] center."[83] Similarly, the on-site personnel were forbidden to reveal their true affiliation. When he arrived at Bruyères-le-Chatel in 1957 to supervise the site's security, Robert Bessart was told "Here, it's Radio-Mana (…) We were not allowed to say that we worked for the CEA, it was supposed to be an agricultural business".[84] Officials had even classified the surroundings as farmland to prevent any construction around the research center.[85] This choice led to several incidents and litigations with the authorities who sought to understand why such a small center benefitted from such important funds – and also why it had constructed buildings on farmland… Journalists once picked up the scent but did not follow through and abandoned their investigation– "and secrecy remained protected", writes Rocard.[86] In at least one case, police officers were prevented from entering the site "by armed guards with dogs" without official affiliations.[87] The sites were guarded by security personnel, although entitled with minimal power and armed simply with a hunting rifle.[88] This, according to Pierre Billaud, might have been a concealment strategy: by posing as *garde-chasse* (gamekeepers), they were less likely to attract attention to the site.[89]

This isolation was justified on the grounds that, first, the nuclear program was fully unofficial and, second, that some among the CEA personnel would have opposed it had they known. In July 1954,

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82 Mongin, "La Genèse de l'armement Nucléaire Français. 1945-1958.," 383.
83 Buchalet, "Les Premières Étapes (1955-1960)," 48; Yves Rocard, *Mémoires sans Concession* (Paris: Bernard Grasset, 1988), 176.
84 Interview with Robert Bessart, former head of security for the CEA's military site (1957-1962), 551AP/13, AN, vol.II, Interview VIII, 13th November 1987, 11-12.
85 Buchalet, "Les Premières Étapes (1955-1960)," 48.
86 Rocard, *Mémoires*, 176.
87 Buchalet, "Les Premières Étapes (1955-1960)," 48.
88 Interview with Robert Bessart, 551AP/13, AN, vol.II, Interview VIII, 13th November 1987, 11.
89 Pierre Billaud, "Naissance de La DAM," accessed November 10, 2022, http://pbillaud.fr/html/nuc2.html.

before the decision to build an atomic bomb was made, 665 CEA employees (1/3 of the personnel) signed a long petition to oppose the possibility of a French atomic weapon.[90] Therefore, when Guillaumat created the BEG, he was aware of the need to isolate it from the rest of the personnel to prevent further contestation. Some of the theoretical work which took place on civilian sites, such as the Châtillon fort, was done by a team working in a separate barrack, and who did not share its meal with the rest of the personnel.[91] Saclay, the CEA's most important center, devoted to fundamental research, remained excluded from any military research. For security reasons, it was decided that a "hermetic" separation should be maintained.[92]

The lack of available sources precludes a study of French classification and declassification rules, and hence proper understanding of how technical secrecy was maintained. However, it is possible to study the development of personnel control practices, though archives are scarce.[93] In the absence of existing literature on the issue, it is worth delving into the history of the French nuclear personnel control regime. It reveals much about how the nuclear secrecy regime developed itself autonomously from normal practices of secrecy, even relying on its own security service. This reinforced the program's clandestinity by ensuring the segregation of those who could have knowledge of it and those who could not.

Before engaging in a military program, the CEA had a minimal secrecy policy and no internal security service.[94] Guillaumat's arrival at the head of the CEA, in 1951, was followed by rapid and profound internal reforms in personnel control. He also attempted to introduce a labor agreement forbidding opposition to Government policy – with the goal of preventing opposition to military research.[95] It failed. Guillaumat then decided, in late 1952, to reform the personnel control practices. Why then? Available evidence does not give a clear answer. but point towards a general desire to make the CEA more

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[90] Letter from the 665 members of the CEA, July 1954, GR1 Q19/2, SHD.
[91] Billaud, "Naissance de La DAM."
[92] Interview with Paul Bonnet, General Engineer at the CEA, 551AP/14, vol.III, interview n°XV, 24th March 1988, 17.
[93] The CEA Departement of Safety and Protection of Secrecy has yet to deposit its archives for public consultation. Personal communication with a CEA Archivist, 31st March 2021.
[94] See chapter 3.
[95] Interview with Pierre Guillaumat, 551AP/13, AN, vol.II, Interview I, 3rd June 1987, 19.

secretive to prepare it for military research. Three men seemed particularly involved in that reform, all of whom desired a military program: Guillaumat, General Henri Bergeron and Félix Gaillard.[96]

In 1953, a "Secrecy committee" was created as part of a protocol between the CEA and the Interior ministry. It was rather modest and not autonomous from the regular police. The protocol itself seem to have been very secret: high-ranking officials from Homeland security confessed they did not know about its content in the early 1960s.[97] Personnel clearance was still the responsibility of the DST, and the Security service was mainly concerned with controlling external personnel on sites. [98] The CEA also required to be informed on any opened case against a member of the CEA personnel. Because of the "confidential, and even secret, nature of some research pursued by the Commissariat, and in particular of some results obtained", Guillaumat wanted to prevent the risk of "some involuntary negligence or indiscretion" which could happen during the investigation.[99] In 1954, "with the military orientation", the CEA administrators felt "required to do something" and further strengthen the existing regime.[100] The practice of DST inquiry was abandoned because "it turned out that the investigations, very superficial for that matter, were of a slowness incompatible with the rhythm" of CEA activities.[101] Now, the CEA security service would be responsible for some investigations, and the DST would give opinions – an arrangement not agreed upon in the protocol designed only a year before.[102] It was the

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[96] The negotiations between the different institutions were led by Gaillard himself. His first letter dates back from the 12th January 1953, but indicates that discussions with the CEA likely started earlier (See Letter from the Ministry of Interior to Félix Gaillard, "Sécurité du Commissariat à l'Energie Atomique", 16th March 1953, n°D.2319/633/500, AG(5)/1/855, AN). December 1952 was when Guillaumat started to explicitly consider the possibility of military research inside the CEA, envisioning the creation of a special research section on the military application of atomic energy (Pô, "La DAM Du CEA," 37.). Bergeron, for his part, is mentioned as a member of the Committee for Atomic Energy particularly interested in the modalities of CEA security reform (See the handwritten notes from the Ministry of Justice, "Compte-rendu", 15th November 1953, 19950317/126, AN).

[97] Note for the General Director for Homeland security, "Projet de protocole entre la D.G.SN et le CEA", 7th May 1963, REG/DN/n°72, 19920172/8, AN; Draft « Projet de protocole entre la Direction Générale de la Sûreté nationale et le CEA », 19920172/8, AN, Annex I, 2.

[98] Note « Le Commissariat à l'Energie Atomique (C.E.A) », 9th March 1954, Très Confidentiel, GR 1 Q19/2, SHD, 8

[99] Letter from Guillaumat to the Ministry of Justice, "Enquêtes concernant le Commissariat à l'énergie atomique", 20th February 1953, 19950317/126, AN.

[100] Handwritten notes from a conversation with Dhouailly, head of the CEA security service, entitled "M. Dhouailly", undated (c. 1965), AG(5)/1/855, AN.

[101] Note "Nature, organisation et fonctionnement du Département de la Sûreté et de Protection du secret au Commissariat à l'Energie atomique", undated (c.1966), AG(5)/1/855, AN.

[102] Notes entitled "M. Dhouailly", undated (c. 1965), *Ibid.*

beginning of the CEA's drift away from the "normal" modes of security governance. In 1956, it was decided that the General Administrator would be solely responsible for security in his establishment. The CEA personnel was vetted, but not solely. It also was required to sign a declaration according to which he recognized that any violation of secrecy would be punished by forced labor – and not prison, as one would have expected.[103]

Some, particularly General Bergeron, also considered the possibility of issuing a decree which would clearly define the boundaries of nuclear secrecy. It was quickly abandoned, since such a text "would only give publicity to what we wished to keep secret".[104] This is not anecdotal: as the CEA was slowly, but surely, edging toward a nuclear program, it was acquiring more and more autonomy, and particularly the ability to independently define what was, or was not, a nuclear secret. In a testimony given in 1985, General Buchalet, in charge of the BEG, noted that "as it expanded, the BEG, because of its very mission, became a more and more autonomous unit inside the CEA, with its own rules, and its own management".[105] A notable form of autonomy was the use of its own classification system, the SECRET ATOME, functioning outside of the boundaries of the normal classification, and similar to the British ATOMIC stamp. The overall picture given by this regime is one of extreme secrecy, and full-blown clandestinity which created a very strict definition of who could know French nuclear policy, restricting legislative control as a direct consequence.

ii. Legislative control: Exclusion and willful ignorance

The first immediate implication of this secrecy for legislative control was the total exclusion of any member of parliament from any decision, from the choice of acquiring nuclear weapons generally to more specific development choices. This was a conscious project on the part of administrative and military leaders, who feared any public discussion was likely to go against their preferences.[106] As a result, all decisions related to the program were taken behind closed doors, either by the Defense

[103] According to a testimony cited in Bruno Barrillot, *Le Complexe Nucléaire. Des Liens Entre l'atome Civil et l'atome Militaire* (Lyon: CDRPC, 2005), 61.
[104] Handwritten notes from the Ministry of Justice, "Compte-rendu", 15th November 1953, *op. cit.*
[105] Buchalet, "Les Premières Étapes (1955-1960)," 47.
[106] See the debates discussed in the previous chapter, section 4 b.

Committee, or by the head of government himself. The policy was, as Buchalet recounts, "with each new government, the President of Council designate would be informed of the verbal agreement given by his predecessor, his responsibility being to confirm it… verbally."[107] The verbal nature of the order, which left no paper trail, exacerbated the exclusion by reducing the audience to those present in the room at this moment. It also prevented accountability by creating plausible deniability. All in all, it seems that the list of ministers who knew directly about the program was limited to the Prime Minister, the Minister of Defense, and his associated minister Palewski, the Minister for Finances and the Minister of the Industry. A consensus was far from formed, hence the use of secrecy to hide the program even from other government members.[108] Action policy, therefore, was made with the total exclusion of the public.

Regarding force development, the program was organized and funded based on secret protocols signed between the relevant ministers. One such a protocol was the one signed on the same day as the approval of the 1955 five-year plan, between Palewski, the Minister of Defence and the Minister of Finance. It provided for two main things: a financial contribution by the Ministry of National Defense and the provision of plutonium by the CEA.[109] To keep this financial contribution hidden in the state budgets which had to be presented to parliament, vague names – such as the BEG, renamed *Direction des Techniques Nouvelles* (Direction for New Technics, DTN) in 1957 – and black budgets were used. To account for the military funds transferred to the CEA, a special chapter in the military's budget was created, simply called "Special studies" (*Etudes spéciales*). [110]Its official purpose was to fund research into a nuclear-powered submarine.[111] From this chapter, as well as from a fund connected to the Prime Minister simply named "Allowance to the CEA", funds were transferred secretly, without specific terms,

[107] Buchalet, "Les Premières Étapes (1955-1960)."
[108] It is how Jean Marc Boegner, then director of Palewski's cabinet, justifies the secrecy around this protocol. Interview with Jean Marc Boegner, 551AP/13, AN, vol.II, Inteview X, 9th December 1987, 7. My understanding is that the Prime Minister, the Minister of Defence, and his delegate Minister, and the Finance Minister were informed. It is also probable that the Minister for Industry, interested in the CEA production, was informed too.
[109] Scheinman, *Atomic Energy Policy in France under the Fourth Republic*, 122.
[110] Commissariat à l'Energie Atomique, the French Atomic Energy Commission, in charge of both the military and civilian program.
[111] Cour des comptes, « Note sur l'emploi des crédits des chapitres de la Défense Nationale (Section Commune) pour l'exercice 1955 », 13th December 1956, 20180707/35-20180707/36, AN, 5.

in a similar fashion to the British atomic expenditures.[112] The creation, in October 1954, of the vaguely named "Explosives Committee" (*Comité des explosifs*) also made it possible to take out unlabeled military loans.[113] When the "Special studies" section's creation came to be discussed in the parliament's Defense Committee, MPs simply noted that it was "natural that the present report [did] not [insist]" more on it, considering that it referred to secret studies.[114] These efforts at concealing the program's budgetary footprint, and the fact that research was taking place in fully secret places anyway, meant that Parliamentary information was reduced to bits and pieces, excluding it from any decision. So much that a 1961 internal report concluded that "no legislative control could have been exerted over these spendings" and, in fact, the Ministry of Armies itself "never acquired knowledge of the precise use of those credits".[115]

A similar effort at exclusion is visible in the decision to proceed to nuclear tests in Algeria, made without informing anyone beyond a handful of officers. Historian Renaud Meltz contends that (then) Colonel Ailleret took the decision to select the Reggane test site "almost alone".[116] To fool external actors, it was proposed that the project be named "extension of the n°2 Colomb-Bechar firing range", referring to a place located 400km away from the actual site.[117] A decree from May 1957 classifying the site as a military terrain, did not refer to its nuclear nature.[118] The purpose of the site was concealed to most military personnel in Algeria: CEA personnel sent in a scouting mission struggled to find someone to transport them to the site. Because no one was aware of the importance of their mission, no one rushed

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[112] Commission de vérification des comptes des entreprises publiques, « Rapport complémentaire établi sur certains aspects de la gestion du CEA pour l'exercice 1960 », 123 K. Ext1, Secret, 20110333/7, AN, 3-4.
[113] Cour des comptes, Rapports sur les dépenses d'expérimentations et d'armements nucléaires entre 1968 et 1970, undated, 20190707/39, AN, 20, fn. 2.
[114] Written notes by André Boutemy, "Exposé devant la commission de la Défense nationale, « Section Commune »", undated (1956-57), 553AP/20, AN.
[115] Rapport sur les rapports financiers entre le Ministère des Armées et le CEA, 21st November 1961, 283/VM/61, Diffusion Restreinte, 9 R 57/3, SHD, 6-7.
[116] Renaud Meltz, "Pourquoi La Polynésie ?," in *Des Bombes En Polynésie. Les Essais Nucléaires Français Dans Le Pacifique*, ed. Renaud Meltz and Alexis Vrignon (Paris: Vendémiaire, 2022), 46.
[117] Général Lavaud, "Création d'un Centre d'Expérimentation des Armements Nucléaires," 15 July 1957, no. 299/DN/CAB/ARM, très secret, GR 2 R229, SHD. Thanks to Austin Cooper for sharing this document.
[118] Arrêté du 10 mai 1957 relatif à l'utilisation comme terrain d'expérimentation la zone située au Sud-Ouest de Reggane, 19760078/72, AN

to find them a plane…[119] The Parliament was never consulted on the question and would gain knowledge of it only after construction had begun.

It must be noted that exclusion was maintained by the fierce secrecy regime, but also by a lack of parliamentary and journalistic engagement with the matter. The specialized press, read by few but publicly available, would mention the interest of some members of the military in nuclear weapons, but investigations never went further.[120] Some representatives asked questions, but they obtained evasive answers.[121] Aside from that, as Lawrence Scheinman has noted, "there was no concerted effort by any parliamentary group to precipitate debate on military atomic policy by use of written or oral questions with debate or through the use of the interpellation".[122] I would argue that this lack of curiosity was the result of the informal exclusion mechanism: MPs were certainly *aware* of the program, but did not dare, or wish, to ask more questions. They were in denial. The shape of Parliamentary debates during 1956 confirms such an interpretation.

In 1956 the "absolute secrecy" around the program was softening slightly as a result of debates around the Euratom treaty. In January 1955, the idea of a European atomic community had started to grow in the wake of the Geneva Conference and took the shape of what would become Euratom.[123] The Euratom project aimed to pool together European's states resources for atomic energy research, but also to control states' fissile material. The proponents of nuclear weapons found such a situation unacceptable, as it would mean the end of French nuclear ambitions. For Guy Mollet it represented a potential nightmare and a life-threatening situation for his government.[124] To maintain power, Mollet had to make substantial concessions, pledging to devote funds to a uranium separation plant and promising that France would not conduct a nuclear explosion before 1961. In the course of debates, Mollet made a substantial

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119 « Première mission à Reggane », Bulletin de la DAM, n°69, Juillet 1980, 28, Obsarm Archives.
120 On those military debates, see Delmas, "A La Recherche Des Signes de La Puissance. : L'armée Entre Algérie et Bombe A"; Sauvage, "La Perception Des Questions Nucléaires Dans Les Premières Années de l'Institut Des Hautes Etudes de Défense Nationale (1948-1955)."
121 Scheinman, *Atomic Energy Policy in France under the Fourth Republic*, 175.
122 Scheinman, 204.
123 John Krige, "The Peaceful Atom as Political Weapon: Euratom and American Foreign Policy in the Late 1950s," *Historical Studies in the Natural Sciences* 38, no. 1 (February 1, 2008): 15.
124 Hymans, *The Psychology of Nuclear Proliferation*, 111.

announcement to the parliament: France was conducting "studies" into the "possible" military uses of atomic energy. The revelation was not exactly groundbreaking. A few weeks earlier, in June 1956, in front of the High Chamber, senator Edgar Pisani had defended a project to create a military division inside the CEA. Since it was already known that Mendès-France had approved such research, likely because of press leaks following the December 26, 1954, meeting, and since such an office existed inside the CEA "in semi-clandestinity", it might as well become official.[125] Of course, Pisani and his peers had not found out about the research through investigative work. Rather, they had been briefed by Ailleret, who wished to accelerate the political work on nuclear weapons.[126]

What this project shows is the awareness of the French representation about ongoing research. Though nothing had been told officially, it seems clear that many had gathered that France was on its way toward a nuclear arsenal. It was, to a certain extent, common sense: France had nuclear reactors able to produce plutonium, and a reprocessing plant in Marcoule. From an infrastructural perspective, it had most of requirements for a nuclear program, and everyone could know that. Mollet's declaration that France was indeed engaged in research into the military uses of nuclear energy was not entirely revolutionary and somewhat similar to the British 1948 announcement. It did not provide many additional details: the public knew that *some kind* of research was being carried out, but did not know where, by whom, what it had accomplished and how much it had cost. Moreover, the declaration referred to the *possible* uses of atomic energy, and not to the fact that a full-scale nuclear program was ongoing.

In a sense, it likely reinforced secrecy more than weakened it. Such a declaration merely confirmed that there was indeed a secret, or secrets, and that the parliament would not be privy to them. It reinforced the legislature's dependency on the executive for information. For Eva Horn, it is "the awareness (or belief or suspicion) that a secret exists, which, especially in the context of power relations, can have a greater impact than a real secret".[127] It reinforced the public denial: the parliament was aware a policy existed as much as it was made aware of the fact that it should not be dealing with it – which MPs

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[125] Report from the Commission for National Defense on the creation of a military division inside the CEA, n°516, 8th June 1956, GR 1 Q19/2, SHD.
[126] Ailleret, *L'aventure Atomique Française. Comment Naquit La Force de Frappe.*
[127] Eva Horn, "Logics of Political Secrecy," *Theory, Culture & Society* 28, no. 7–8 (December 2011): 109.

accepted. Pisani's proposal for the creation of a military section in the CEA is a great example of this: after being passed by a majority in the high chamber, it then completely disappeared from discussion, and nothing came out of it.[128]

In France, as in the UK, the clandestine period equates with a total absence of legislative control over nuclear policy. The extreme secrecy regime which left external actors with almost no information about the conduct of nuclear policy excluded the parliament from decision-making. When opportunities for control were presented to the parliament, stratagems for concealment allowed the executive to escape its scrutiny by hiding the program's cost behind false names. More generally, the structural secrecy which characterized France's nuclear activity left little information about the program in the public space. Nevertheless, awareness of the program started to emerge, and some parliamentary discussions took place. A vote even took place in the high chamber, but nothing came out of it. Formally excluded from decision-making by walls of secrecy, the parliament was also informally excluded. The level of informality was even higher than in the British case, since no D-notice or censorship system existed in France. Nothing technically prevented anyone from mentioning the program, except the general acceptance of secrecy even by external actors. As a result, when the program's official existence was acknowledged in 1958, it was already deeply entrenched.

c. A program in plain clothes: Sweden's clandestine period (1947-1954)

The Swedish nuclear program was characterized, for as long as it lasted, by a strong intertwining by the embeddedness of military research into the civilian program. The resulting cooperation between civilian researchers at AB *Atomenergi* and other private firms and military researchers at FOA complicated the task. Not only was the line between the civilian and military value of knowledge difficult to draw, but the situation also meant rules of military secrecy had to be imposed on private actors operating in fully civilian settings. The problem might not have existed if, like France or the UK, Sweden had centralized nuclear research inside one main institution. But research was conducted inside several institutions all

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[128] Why it disappeared is not established, it is however clear that Guillaumat was extremely satisfied with it, since Pisani's proposal would have implied for the CEA to share power with the military in the conduct of the program. Interview with Pierre Guillaumat, 551AP/13, AN, vol.II, Interview I, 3rd June 1987, 12.

over the country. From 1947 to 1954, officials devoted a lot of effort to developing satisfying information controls in such a setting, putting nuclear research under a relative state of exception.

These efforts at organizing secrecy over nuclear research had a clear implication: concealing the program from public view and legislative control. Though this seems eerily similar to the British and French story, an important difference must be noted upfront. While British and French officials sought to hide a full-scale production program from the parliament, Swedish officials "only" hid small-scale research efforts aiming at building the basic infrastructure for nuclear acquisition. The scale, and thus the costs and the infrastructure, of the program was much easier to hide and required less effort to conceal. That is to say that, though the mechanisms through which secrecy operated and produced effects on Swedish democracy were similar to the French and British cases, they did not produce the same democratic implications.

i. The secrecy regime: the interweaving of military and civilian secrecy

What characterized the Swedish nuclear secrecy regime, and effectively distinguishes it from the British and French one, is the weak overall differentiation between "normal" and "nuclear" state secrecy. That is, though nuclear knowledges were the object of specific regulations, these were adaptations to existing secrecy practices more so than the building blocks for an autonomous regime of secrecy. FOA never came to use an "atomic" classification of any kind. Rather, research on military uses of nuclear energy was embedded into the general secrecy surrounding the institute. Research on nuclear weapons took place inside FOA's Section 2, which also studied rockets and explosives more generally. It certainly was a very secret place, with fences and guards around it, but there exists no indication that any kind of "special" regime of secrecy was applied to nuclear research.[129] Frequent exercises were organized to test the vulnerabilities of the system, and personnel were reminded of the importance of caution when handling secret information through training.[130] As an internal document from 1946 noted, military

[129] PM rörande säkerhettjänsten vid FOA, 15th December 1948, Hemlig, DNR H 249, FOA Arkiv, E IIIa:4, RA.
[130] Rapport över inspektion av bevakning m.m vid FOA 2 Grindsjön natton 21/12 – 22/12 1953, 26th January 1954, Hemlig, Dnr H 16-096, FOA Arkiv, E IIIa: 12, RA.

researchers were “used to working with secret matters”.[131] The problem came from outsiders, notably the consultants on which FOA had to rely due to a shortage in manpower, since “it is always more difficult to keep a research secret in an open research institute than it is at FOA”.[132]

This reliance on outsiders was characteristic of atomic energy work in Sweden. As explained in the previous chapter, in 1947 a semi-public institution was created, AB *Atomenergi*, to handle the industrial realizations of the program and lay the groundwork for the exploitation of atomic energy. In 1948, it signed several agreements with FOA and somehow became part of plans for nuclear weapons. The two institutions enjoyed a very close cooperation: their agreements stipulated that all information, except those protected by military secrecy, should be shared between the two institutions, and that *Atomenergi* personnel would effectively join FOA’s efforts in case of war.[133] In 1947 the government demanded that atomic research be subjected to secrecy regulations, and its personnel placed under a particular system of control. This implied an extension of military practices of secrecy to the civilian sector.

The responsibility for organizing secrecy on nuclear research was given to the *Atomkommitté*, as well as to the head of the Defense Staff. The latter originally sought to monopolize this prerogative, but saw his proposal rejected by the *Atomkommitté*.[134] In December 1947, the *Atomkommitté* drew up a list 30 institutions or persons, private and public, whose work would now be the object of special regulation. Not only would part of their work have to be kept secret, but personnel would also have to be investigated by the state police to determine if they were fit to work on matters as sensitive as atomic energy.[135] Per the request of Georg Thulin, the superintendent of state police, this control was ensured by the “Third division” (*tredje roteln*), a special division of the state police in charge of counterespionage. This was, in itself, remarkable as only three activities were subject of control by this

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131 P.M ang hemlighållandet av arbeter rörande atomenergiens utnyttjande, undated (1946), Hemlig, FOA Arkiv, F I: 1-2, RA.
132 ”Sammanfattning av avdelningschefernas redogörelser för utladga forskningsuppdrag”, 26th April 1954, Hemlig, FOA Arkiv, E IIIa: 11, RA.
133 Överenkommelse mellan FOA och AB Atomenergi, 3rd November 1950, Hemlig, H4029-2091/50, FOA Arkiv, F1: 1, RA.
134 Bilaga 2 till protokollvid sammanträde med Atomkommittén den 3 oktober 1947, 3rd October 1947, Hemlig, AK Arkiv, A Ia:12, RA.
135 Bilaga till protokoll av den 15 december 1947 vid sammanträde med atomkommittén, Hemlig, A Ia:12, RA.

service: the police forces, the foreign department, and atomic research.[136] By 1949, AB *Atomenergi* personnel was systematically vetted. A look at the division's investigations shows that inspectors were searching for something in particular: communists.[137] As in France and the UK, communists were identified as the natural suspects for infiltration by the Eastern bloc, and hence a potential threat to the state's well-guarded secrets. Once hired, personnel would be sworn to secrecy about their research.[138] Finally, foreigners were not allowed to work in any of those institutions, unless they were previously approved by the *Atomkommitté*. Even then, the policy advocated by the Chief of the Defense Staff was that as soon as a company's work was of military importance, or someone working in any department could draw conclusions about Swedish nuclear capabilities, foreigners should be banned unless they were absolutely essential and could not be replaced by a Swedish person.[139]

Though these measures were rather harsh, Swedish officials were more lenient when it came to patents. They explicitly refused a solution similar to the US, which would have made every patent on atomic energy secret by nature and subject to the authority of a special commission, considering this solution impractical and costly. Rather, all patents were given to a committee which would raise the question of secrecy only if patents had obvious military implications or seemed of importance for the industrial uses of atomic energy. In those cases, they would be examined by the Chief of Defense staff, who could oppose publication. If not, the *Atomkommitté* would decide whether it could be published.[140] This system made an exception of Sweden, as it implied that a semi-private organ was responsible for defining the boundaries of nuclear secrecy. This, however, did not necessarily imply that Sweden was more open. The interlacing of military and civilian research cast a veil of secrecy over the entirety of Swedish nuclear research. For example, work over the R1 reactor, which would become Sweden's first nuclear

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[136] "Politisk Övervakning Och Personalkontroll 1945-1969. Säkerhetspolisens Medverkan i Den Politiska Personalkontrollen" (Stockholm: Statens Offentliga Utredningar, 2002), 67–68.
[137] Results of these investigations can be consulted in the archives of the Civil Defense Directorate (*Civilförsvarstyrelsen*), box EIIIb:1, RA.
[138] Bilaga till protokollvid sammanträde med Atomkommittén den 12 september 1947, Hemlig, AK Arkiv, A Ia:12, RA.
[139] Bilaga till protokoll nr 61 vid sammanträde med Atomkommittén den 26 februari 1953, Hemlig, AK Arkiv, A Ia:12, RA.
[140] Bilaga till protkoll vid sammanträde med Atomkommitténs arbetutskott 9.2.51, Hemlig, AK Arkiv, A Ia:12, RA.

reactor, was taking place in great silence, though certain research results were published in scientific journals.[141] When AB *Atomenergi* cooperated with FOA, similarly, a "pre-requisite" was that both partners endeavored to share as much as possible with each other, while not sharing anything with the outside.[142] Moreover, when it directly came to nuclear weapon plans, secrecy was total: only a small circle of decision makers had heard about the nature of the research conducted at FOA.

ii. Legislative control: an absent topic in Parliamentary debates

How did secrecy affect the Swedish parliament's ability to control nuclear policy? It was, first of all, excluded from the policymaking debates. It does not seem that the government itself was particularly interested in the nuclear issue during the clandestine period. It was aware of what was going on at FOA, who regularly reported through secret reports, but there is no indication of a particular interest from policymakers before 1954. The main locus of decision-making therefore was not the cabinet but the secretive *Atomkommitté*. Starting from late 1947, the deliberations of the *Atomkommitté*, which were already kept from the public, got an extra layer of secrecy. Some of its deliberations, instead of being added to the bulk of the text, were kept apart in special appendixes stamped "Secret" – while the rest of the protocols was not – and kept in a safe.[143] The *Atomkommitté's* policy was that any research results regarding the extraction or enrichment of uranium, or even its prospection, and those regarding the building of atomic reactors or the construction of atomic bombs should be kept secret.[144] But it was not simply about keeping technological secrets: documents about AB *Atomenergi*'s policy and purpose were also kept in that safe.[145] The Parliament was, *de facto*, excluded from the making of Sweden's action policy.

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[141] Maja Fjaestad, "Sveriges Första Kärnreaktor - Fran Teknisk Prototyp till Vetenskapligt Instrument" (Stockholm: Statens kärnkraftinspektion, 2000), 24, 29–30.
[142] Letter from Jan Rydberg, "Förslag till uppdelning av vissa arbetsuppgifter mellan AB Atomenergi och FOA 1, 11th January 1955, Hemlig, FOA archives, Ö IV:6-7, RA.
[143] As a result, while the *Atomkommitté*'s minutes from the late 40s/early 50s were available in the 1970s, these appendix were kept classified until 1997. Evidence of the use of a safe to store these documents come from a letter where a civil servant notes that some documents are actually missing from said safe. Letter from Ejvor Ljungkvist to Gösta Funke, 24th October 1958, AK Arkiv, A Ia:12, RA.
[144] P.M. angående sakförhållanden inom den målbundna atomenergiforskningen, som med hänsyn till rikets försvar icke böra offentligöras, 1947, Hemlig, Civilförsvarstyrelsen arkiv, E IIIb:2, RA.
[145] For example, "Summarisk för redogörelse för A.B. Atomenergis arbetsprogram och om foreliggande arbetsuppgifter, 3rd September 1948, AK Arkiv, A Ia:12, RA.

This was also partly the result of the specific procedure through which budgets were allocated to FOA, and therefore to force development policies. Essentially, FOA would send a secret application to fund specific research objects to the government, which would approve or reject them, before presenting them to the parliament as part of the annual budgetary vote. Then, the government would allocate the funds more specifically.[146] In its secret request, FOA was stating upfront that some of the money would be used for research related to atomic weapons.[147] The parliament, however, got none of this information. Atomic bombs were not absent from parliamentary debates, but only because Swedish officials and lawmakers sought to acquire means of protection against them.[148] Between 1947 and 1954, the "atomic bomb" would appear several times in Parliamentary debates, but mostly when discussing its international prohibition, or its implication for Swedish defense and vulnerability.[149] There was nothing illegal about this arrangement – contrary to the British and French ones, which overtly flirted with illegality. It was, however, pretty handy. Instead of engaging in positive actions of concealment, Swedish officials benefited from the passive effects of structural secrecy which surrounded nuclear affairs in general.

Aside from this, however, came actual attempts at concealing the military nature of FOA's research, particularly as the program grew. The cooperation between FOA and AB *Atomenergi* was not hidden, but certain aspects of the work were presented deceptively so as not to attract attention to its true nature. For example, the FOA was responsible for plutonium chemistry work, but claimed it was carried out by civilian researchers, and only took place at FOA because of "local shortage".[150] In fact, it was taking

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[146] Lars van Dassen, "Sweden and the Making of Nuclear Non-Proliferation: From Indecision to Assertiveness," SKI Report (Stockholm: Statens kärnkraftinspektion, March 1997), 9.
[147] See, for example, Plan för verksamheten vid FOA 2 under budgetåret 1950/51 och 1951/52, 22nd May 1950, Hemlig, H 2143-010, FOA Arkiv, E IIIa:6, RA.
[148] The question of "protection against atomic weapons" was frequently discussed in the parliament and featured in budget requests. See, for example, *Kungl. Maj:ts proposition till Riksdagen angående statsverkets tillstånd och behov under budgetåret 1947/48*, bilaga 6, 177-178, which features a request from the Marine for protection of boats against nuclear weapons. Similarly, *Kungl. Maj.ts proposition n°176 till riksdagen med förslag till lag om ändring i civilförsvarslagen den 15 juli 1944*, 30th March 1951, which states the need for research into the protection against atomic bomb, as well as for civil defense. On Swedish civil defense more generally, see Vilhelm Sjölin, ed., *I skuggan av kriget: svenskt civilförsvar 1937-1996* (Stockholm: Instant Book, 2014).
[149] Based on the data available at www.riksdagen.se. Regarding the implication for future defense, the 1947 Supreme Commander report on future defense mentioned that nuclear weapons would likely be used in future war but did not translate this conclusion in a public stance in favor of nuclear weapons. Jonter, *The Key to Nuclear Restraint*, 51–52.
[150] Agrell, *Svenska Förintelsevapen*, 138–39.

place at FOA because of the military's interest in plutonium. The very choice of Sweden's first reactor type – based on natural uranium – was clearly driven by the military's desire for plutonium production, a fact however left unsaid.[151] Similarly, the head of research at AB *Atomenergi* was Sigvard Eklund, a former FOA researcher who acted as an unofficial liaison between the military and civilian research, restricting the publicity of those exchanges.[152] Though a civilian researcher, it was clear for him that "since the military need will, sooner or later, need to be accommodated", someone in the civilian sector should be doing it.[153] Between 1949 – when nuclear weapons started to feature clearly on FOA's agenda – and 1953, there was little to hide: though research oriented toward the military uses of nuclear weapons was taking place, it was not the most important part of FOA's work. Even research directly oriented toward weapons production was not necessarily nuclear weapons research in the common sense of the term: during a short period, much research was carried with the goal of producing radiological weapons, based on the diffusion of radioactive gas.[154]

The use of concealment schemes to ensure exclusion became much more important around 1952. In that year, FOA's head of nuclear chemistry, Jan Rydberg, commissioned a new study on how to produce atomic bombs to replace the previous one, which he believed was based on obsolete data.[155] The purpose of this investigation, as its title indicated, was to study the necessary conditions for the production of atomic bombs. It was concluded in 1953. Though incomparable to a decision to produce atomic bombs, it undeniably constituted an important policy move since it indicated a clear intent to prepare a weapon program. For this reason, it was kept highly secret and not made public. The head of the *Atomkommitté* claimed that, due to the "strongly secret nature" of the matter, it should not be discussed in a plenary

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151 Karl-Erik Larsson, "Kärnreaktorn R1 - Ett Stycke Högteknologisk Pionjärhistoria," *Daedalus*, no. 50 (1981): 112.

152 Jonter, "Sweden and the Bomb. The Swedish Plans to Acquire Nuclear Weapons, 1945-1972," 30. Thanks to Thomas Jonter for emphasizing this point to me.

153 P.M angående samtal med doc. Eklund i AB Atomenergi 29/1 1957, 29th January 1957, Fösvarsstaben arkiv, F2:1, RA.

154 It was not a great success and was eventually abandoned. That Swedish researchers devoted time and resources to such goal perplexed US policymakers who thought of it as a not "very helpful avenue and thought it might be a kindness to the Swedes to intimate this fact to them". Memorandum of Conversation, by Mr. David H. McKillop of the Office of the Under Secretary of May 3, 1949. Top Secret, FRUS 1948, General; United nations, volume I, part 2, 465; Agrell, *Svenska Förintelsevapen*, 84–85.

155 Jonter, *The Key to Nuclear Restraint*, 62.

session of the commission, but in a smaller delegation.[156] The head of FOA 2, Torsten Magnusson, reached a similar conclusion: the study "as well as the continuation of the work should be treated with a high degree of secrecy".[157] Considering that FOA's work was already secret, this meant the study should be *even more* secret than the rest. Only a handful of people would therefore know of it.

The idea of a new study coincided with some military officers' public endorsement of nuclear weapons. In November 1952, General Westring wrote an article in a specialized journal, advocating nuclear weapons for the Swedish Air Force.[158] The next month, the Air Force Chief of Staff publicly declared his support for nuclear weapons acquisition.[159] The Minister of Defense rapidly went public to say that, so far, the issue had not been raised inside the government. This was a white lie: the issue had clearly been raised, at least passively, when discussing FOA's budgets. But it is true that it was only after the 1953 study that a clear interest for nuclear weapons began to develop inside policy circles. Nevertheless, when Section 2 devoted more resources to nuclear weapons after the study, with as much as a quarter of FOA personnel working on nuclear related issues by mid-1955, no announcement was made either.[160] This happened even though the desire for nuclear acquisition was brewing. The Army leadership, too, became convinced of the importance of nuclear weapons. Chief of the Defense staff Richard Åkerman, for example, noted in his diary in early 1954 that the H-bomb now made many see Swedish defense as "hopeless".[161] A few weeks later, he criticized his predecessor for not taking the invention seriously, and started to appear in favor of it, discussing it more frequently with other military leaders.[162] The problem now attracted the attention of the Prime Minister, Tage Erlander, who also discussed it with his advisor and friend, physicist Torsten Gustafsson in the fall of 1953.[163] He met with prominent physicists

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[156] Atomkommittén med yttrande rörande Preliminär utredning av betingelserna för framställning av atombomber i Sverige, 16th May 1953, Hemlig, Dnr H 110 Saknr 2, FOA Arkiv, E III a:9, RA.
[157] Torsten Magnusson, P.M. angående framställning till Kungl.Maj:t om anslag på tilläggsstat för utredningar beträffande atombombframställning, 10th July 1953, Hemlig, Dnr H 2228-2092, FOA Arkiv, E IIIa:9, RA.
[158] Petter Wulff, "Från Nästan Kärnvapenland till Nedrustningsapostel. En Svensk Helomvändning Kring 1960," *Kungl Krigsvetenskapsakademiens Handlingar & Tidskrift*, no. 2 (2013): 100.
[159] Jonter, *The Key to Nuclear Restraint*, 130.
[160] FOA, "Underlag för långsiktsplan 1968, Sektion 251", 6th November 1968, Hemlig, FOA Archives, Ö IV: 23-31, RA.
[161] Richard Åkerman's diary, 27th March 1954, Richard Åkerman's archives, vol.2, RA.
[162] Richard Åkerman's diary, 31st March 1954, 11th May 1954, Richard Åkerman's archives, vol.2, RA.
[163] Dick Harrison, *Jag Har Ingen Vilja till Makt: Biografi Över Tage Erlander* (Stockholm: Ordfront, 2017), 465.

to discuss the issue, and acquired the conviction that Sweden could, indeed, produce nuclear weapons if it wanted to.[164]

Between 1947, when the first decision of nuclear secrecy was made, and 1953, when a more thorough (and highly secret) study on atomic weapons was carried out, Swedish officials had designed the basic architecture of Sweden's nuclear secrecy regime. It was characterized by harsh rules and regulations designed to prevent the uncontrolled spread of information of importance for the "security of the realm". It was not an autonomous regime, but rather a spin-off of the normal military and industrial regulations in Sweden. It did not rely on specific security organizations, or on a unique classification system. Nevertheless, it did effectively conceal the very existence of nuclear weapons research in Sweden. Clandestinity might not be the exact word to characterize this situation: what FOA was doing was secret, but not truly outside the law. Its budgets were attributed through the normal procedure, though technically no political authority ever ordered it to pursue nuclear research. At the same time, it was clandestine in the sense that it was an area of public policy which remained independent of legislative control, and out of the public space altogether. Though Swedish officials relied less on stratagems of concealment, and secrecy was more a structural product of the secrecy regime, its effects were largely similar. From 1947 to 1954, Sweden was advancing on the road toward nuclear acquisition, and most MPs had no idea – just like the French and British ones.

During the early years of each state's nuclear program, states' attempt to keep their program entirely secret fully excluded the parliament from nuclear policymaking, effectively voiding its ability to exert any control over nuclear policy choices. There was no deliberation, no oversight, and a total lack of accountability. In a sense, one should not be so surprised that a clandestine policy unfolded without legislative control. Nevertheless, it was important to delve into those early years for two reasons. Firstly, in the French and British case, secrecy contributed to the entrenchment of the programs. When the

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[164] Tage Erlander, *Dagböcker, 1953* (Hedemora: Gidlund, 2001), 7.This late epiphany does not mean that Erlander was being fooled by FOA. Each section submitted a rather lengthy annual report on its activities every year, which would have allowed Erlander to conclude that the work was advancing fast. More likely, Erlander had been interested only distantly in the issue before. The reports can be consulted in the FOA archives (RA), in the files EIII.

programs became public, they were already well on their way toward a first nuclear explosion. This implied that the choice was not between acquiring or not, but between pursuing the policy, or dismantling the program. In other words, instead of having to choose between a costly and a cost-free way forward, only two costly choices were possible, since choosing not to acquire nuclear weapons would have meant dismantling existing institutions whose purpose was solely nuclear production. It would have been possible, without a doubt, but costly. Sweden did not face such a problem: its program was hardly entrenched. Renunciation was cheaper.

Second, the clandestine years were foundational in terms of the basic structure of the secrecy regime. Because the program was clandestine, in France and in the UK, it relied on exceptional institutions and mechanisms, justified as much by the supposed requirements of nuclear secrecy as by the need to keep the program secret by restricting the number of actors in the know – the vetting systems in both countries can be understood in this way. After its revelation, as discussed in the coming pages, those basic building blocks would remain in place. Path dependency set in and helped construct nuclear policy as an exceptional object of democratic politics.

3. Legislative control during the legal period: a structurally restricted Parliament

In this section, I turn to the "legal" years of the programs, when their existence was officially acknowledged, and thus when nuclear policy could be an object of legislative control. I adopt a similar approach to the previous section but use a different set of criteria to define control over levels of policy. For action policy, I focus on Parliament's knowledge about the actual military plans and strategy, and the capacity of the arsenal – whether the stockpile, or the delivery vehicles. For development policy, I focus on Parliament's knowledge of H-bomb development, as well as test site selection.[165] For declaratory policy, I briefly discuss the parliament's ability to define the publicly stated goal of the arsenal.

[165] A further study will include a look at the choice of delivery vehicle.

a. Officials talk about the bomb: The British revelation process and its aftermath (1951 – 1958).

By 1951, the British nuclear secrecy regime started to have important costs and drew internal criticism. With the first nuclear test approaching quickly, time had come to reveal the program. When this revelation took place, a few months before the first test in Australia, it was hardly a surprise. With it came many changes in the way secrecy was organized. This had implications for legislative control since the issue would not exclude from parliamentary debates anymore. Nevertheless, a policy of distortion continued, and affected important force development choices. The end of clandestinity did not mean the end of secrecy, but rather the legalization of exceptional practices.

i. The regime of secrecy: a policy not fully unveiled.

By 1951, the policy of secrecy had become a sham. For the MoS, it had become clear that deduction and elimination allowed one to discover the nature of certain sites.[166] Cherwell, Churchill's scientific advisor, argued similarly in late 1951: "Concealment was certainly very necessary at the inception of atomic energy work (…) Now that most of our great atomic buildings are in being or in course of construction, no doubt the Russians have a pretty good idea of the scale of our effort in this field".[167] William Penney, the head of research, insisted, underlining that secrecy was not only awkward, but costly and that "it was essential (…) in order to meet the production and trial dates, to announce that his division was working on atomic weapons".[168] Protests also came from the private contractors involved in the project.[169] Many firms indeed wished they could use their work in those establishments for advertising purposes. This was not necessarily a problem for those who worked on public aspects of nuclear research, but British officials feared that withdrawing the ban on photo publication would raise issues for contractors in more secret factories, notably Windscale. On the other hand, it was expected that refusing this to them would reduce their incentive to participate in atomic energy work.[170] Moreover, as the program's size could not be ignored, it seemed difficult to continue asking the press not to publish

[166] Gowing, *Independence and Deterrence. Vol II.*, 131.
[167] Letter from Cherwell to Winston Churchill, 21st December 1951, PREM 11/297, TNA.
[168] Gowing, *Independence and Deterrence. Vol II.*, 132.
[169] On the private industry in the British project, see Gowing, *Independence and Deterrence. Vol II.*, chap. 17.
[170] Minute by the Permanent Secretary of the Ministry of Supply, 2nd October 1950, AB 8/212, TNA.

on it. The nature of the D-Notice system, which does not imply sanctions if violated, meant that state officials had to win over the conviction of Editors to maintain secrecy, the latter being less and less agreeable with censorship.[171] Once a resource for autonomy, secrecy started to become a millstone around the British program's neck. This phenomenon of "contradiction" is an inevitable aspect of secret programs, according to geographer Trevor Paglen, "because there are no such things as invisible factories, airplanes made out of unearthly ghost-matter, or workers who `don't exist', logics of secrecy are contradicted by their material implementations".[172]

When these accumulate, actors are confronted with the need to go public, or to double down on secrecy. British officials chose to go public. The trigger for this decision was the Monte-Bello test, Britain's first nuclear explosion. As the work intensified in early 1952, and a small fleet set sail for Australia, it was difficult to simply deny their existence, or purpose. The British and Australian governments announced in a joint declaration that Britain would soon test its first nuclear device.[173] The location was revealed late in May 1952, at the Australian government's request, as they considered "it unrealistic to suppose that the precise location can be kept secret any longer" and the disclosure of the site might help tame the criticism, "by disclosing that the test will be made on islands which are known to be wholly uninhabited".[174] In October 1952, the test took place.

This sequence of events broke the silence so loudly that it brought about the shift from awareness to acknowledgment. All of a sudden, what could not be acknowledged before was public. Pincher, once forbidden from publishing about Aldermaston, wrote about the location of atomic weapons work in January 1953.[175] In February 1953, the MoS lifted restrictions on publication about the operation of the Windscale reactors, where the plutonium for the first test was produced, as it was now "obvious that plutonium is being produced, and in consequence that the piles are working".[176] A marker of this new

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171 Gowing, *Independence and Deterrence. Vol II.*, 136.
172 Trevor Paglen, "Goatsucker: Toward a Spatial Theory of State Secrecy," *Environment and Planning D: Society and Space* 28, no. 5 (October 2010): 760.
173 Salisbury, *Secrecy, Public Relations and the British Nuclear Debate*, 21.
174 Minute from Norman Brown to the Prime Minister, "Operation Hurricane", 12th May 1952, PREM 11/293, TNA
175 Gowing, *Independence and Deterrence. Vol II.*, 137.
176 Letter from R.E France to D.A. Shirlaw, 10th February 1953, AB 8/212, TNA.

openness, the High Explosive Research project changed its name, and became the Atomic Weapons Research Establishment (AWRE). The change was not just nominal: freed from the constraint of clandestinity, the British nuclear program could now emancipate itself from the MoS and become a semi-independent public corporation.[177] A consequence of this sudden change, the first demonstration against the nuclear program also took place in Aldermaston in 1952.[178]

Now that the program was official, how would secrecy be organized? Officials talked little more, but an important relaxation of secrecy regulation can be observed. For example, press visits to Harwell were finally authorized. It was not to everyone's taste: the Department of Atomic Energy originally refused it, afraid that "by giving this concession we might only whet the appetite of the Press for more, and that valuable information might, with the best will in the world be disclosed".[179] But, as they eventually noted, a democracy had to abide by certain rules: "Although these visits will be a nuisance to us, I do not see how we can gracefully avoid them; the public has paid for our factories and can rightly argue that within limits permitted by security, they are entitled to know how their money has been spent".[180] In 1954, the MoS also published a volume on "Britain's Atomic Factories", whose purpose was to "release as much information as possible", up to the "limits of declassified information".[181] Many things changed in 1954. In December 1953, Eisenhower had made his now famous speech on the Atoms for Peace program. The stated goal of this policy was rather straightforward: to give to non-nuclear state access to declassified reactor technology and fissile material under control, in order to provide a control of sort over the international dissemination of nuclear knowledges and material.[182] The Atoms for Peace program considerably expanded public knowledges about reactor technology and other fields adjacent to nuclear weapons technology. Its first main act was the reform of the Atomic Energy Act in 1954

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[177] Jones, *The Official History of the UK Strategic Nuclear Deterrent, Vol.1*, 25.
[178] Hennessy, *The Secret State*, 109.
[179] Letter from the Department of Atomic Energy to Christopher Hinton, 9th March 1954, AB 8/212, TNA.
[180] Letter from Sgd C. Hinton to Edwin Plowden, "Press visits to Factories", 11th March 1954, AB 8/212, TNA.
[181] Ministry of Supply, *Britain's Atomic Factories: The Story of Atomic Energy Production in Britain* (London: H.M. Stationery Office, 1954).; Letter from J.A. Dixon to J. Kohl, 29th December 1954, AB 8/331, TNA.
[182] On the Atoms for Peace program, see John Krige, "Atoms for Peace, Scientific Internationalism, and Scientific Intelligence," *Osiris* 21, no. 1 (January 2006): 161–81; Martin J. Medhurst, "Atoms for Peace and Nuclear Hegemony: The Rhetorical Structure of a Cold War Campaign," *Armed Forces & Society* 23, no. 4 (July 1997): 571–93; Jeff D. Colgan and Nicholas L. Miller, "Rival Hierarchies and the Origins of Nuclear Technology Sharing," *International Studies Quarterly* 63, no. 2 (June 2019): 310–21.

which, contrary to the 1946 Act, provided for the *dissemination* of nuclear knowledge and material both to private entities and to foreign states, opening the door to bilateral agreements for research. By 1961, 41 such agreements had been signed.[183] For the UK, it meant that many previously classified patents could now be made public, and that cooperation with the US could now restart.

This should not suggest, in any way, that secrecy ceased to be a major concern for policymakers, nor that the security and diplomatic implications of nuclear weapons had disappeared. Publications of scientists from the Department of Atomic Energy remained under scrutiny – even if written before their entry into service – and positive vetting practices continued.[184] Who was to be vetted was a matter of security concerns, but also of convenience, showing that officials' desires did not always translate into policy. For example, canteen personnel were exempted from vetting procedures, in spite of some security officials demands, as such personnel was "notoriously difficult to recruit".[185] Similarly, officials debated whether to give security clearances to "juveniles"[186]. Though not making teenagers privy to secret national security information might seem like a rational concern, it also affected recruitments since many laboratory assistants, typists and clerks were juveniles.[187] But, considering their young age, it was assumed that they would "have little or no understanding of [information] significance".[188] Security officials chose to compromise and, by May 1957, agreed that they should not be given clearances above access to "Confidential (Atomic)".[189] These issues were the result of a policy of extension of positive vetting procedures to a larger class of personnel, now including not only

[183] Krige, *Sharing Knowledge, Shaping Europe*, 24, 26.
[184] Letter from J.G Clarke to F.L Youell, 26th October 1953, 60/3/Security 2, AB 8/212, TNA.
[185] Letter from D.A. to F.L. Youell, 15th November 1956, AB 8/486, TNA.
[186] The age of majority in the UK was of 21 until 1969.
[187] Letter from G.A. Greenwood to F.L. Youell, "Employment of Juveniles on work involving access to Secret Atomic or higher categories", 26th April 1957, Ext. 157, AB 8/486, TNA.
[188] Letter from F.L Youell to Risley, "Employment of Juveniles on work involving access to Secret Atomic or higher categories", 15th April 1957, 71/1/2, AB 8/486, TNA.
[189] Letter from P.E Nicholls to F.L. Youell, "Barbara Foxwell", 14th May 1957, Staff in Confidence, AEQ 57666, AB 8/486, TNA.

government employees but also contractors' staff.[190] Moreover, new problems emerged, linked notably to the storage of nuclear weapons. How should one acknowledge their presence, in the UK or abroad?[191]

UK officials remained particularly concerned about not appearing too careless with classification of nuclear knowledge. They knew perfectly well that collaboration with the US depended on concessions related to secrecy and negotiations were guided by the assumption that "the Americans' main concern will be to satisfy themselves that classified information they release to us will be properly protected".[192] This means that the boundaries of secrecy were also defined in regard to US demands. In 1955, following the Atomic Energy Act, such a cooperation restarted but on limited terms. The UK gained access to fissile material, but only to a limited set of data related to nuclear weapons, in the context of the development of US war planning in Europe[193]. Even for this, the British secrecy system had to be modified. Under the Anglo-American bilateral agreements, "to ensure that proper security treatment was given it was necessary to add a special marking to all information exchanged", a situation leading to the widespread use of the "ATOMIC" marking over British nuclear documents.[194] Although entrusted with more responsibility regarding nuclear planning in Europe, the UK was still considered a security liability by the US Congress. The perception was different at higher levels, though. In 1957, for example, Eisenhower bypassed domestic opposition and secretly authorized the transfer of information on the *Nautilus* class submarine to the UK[195]. Even limited cooperation had major implications, notably to commit the UK to a selective re-investigation of positive vetting clearances for those who would access US data.[196] This process eventually bore fruit in 1958, when cooperation officially restarted between the British and the US. This time, the requirements of secrecy were all the more explicit: both the 1958

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[190] Draft Paper for N.J.A.C, "The provision of appeal procedure for contractors' employees", 1st May 1956, Secret, CAB 21/4026, TNA.
[191] Stephen Robert Twigge and Len Scott, *Planning Armageddon: Britain, the United States and the Command of Western Nuclear Forces, 1945-1964* (Amsterdam: Harwood Academic, 2000), 63.
[192] Positive Vetting in the Field of Atomic Energy – Copy of a latter from the Security Service, 26th August 1954, SF.53/12/5(180)Supp./C, Secret-Guard, CAB 21/4022, TNA.
[193] John Baylis, "Exchanging Nuclear Secrets," *Diplomatic History* 25, no. 1 (January 2001): 37.
[194] Note of Meeting held in Conference Room, Atomic Energy Office, 1, Richmond Terrace, S.W.1 on Tuesday, 20th March 1956, Secret, FO 371/123105, TNA.
[195] Keith Baum, "Two's Company, Three's a Crowd: The Eisenhower Administration, France, and Nuclear Weapons," *Presidential Studies Quarterly* 20, no. 2 (1998): 320.
[196] It was also agreed that such investigation should be re-done every 5 years. Letter from R. Ive to all directors, Works General Manager and heads of Labs, "Security Clearance Review", 30th July 1958, Staff in Confidence, AB 8/486, TNA.

Mutual Defense Act and the 1963 Polaris agreement came with similar arrangements, according to which UK regulations had to be brought up to US standards, termed "agreed classification policies."[197]

Between 1954 and 1958, the shape of the British secrecy regime was largely transformed. The impact of these changes, however, should not be overstated. Nuclear secrecy was not, in any way, integrated into normal legal practices. Rather, the practices developed during the clandestine period, such as positive vetting, were continued during the legal period. Nuclear secrecy remained exceptional in many ways, and nuclear activities were no more public. What was public was mostly the fact that they existed. Their general shape could be deduced and investigated by the public, and MPs now had much more opportunity to challenge the government's choices. Nevertheless, secrecy remained a structuring element of nuclear policy, affecting the involvement of Parliament in nuclear policymaking.

ii. Legislative control: A parliament lagging behind.

Revelation did not imply a sudden openness over the entirety of British nuclear policy. In March 1952, after Churchill's announcement about the coming test, Labour MP Emrys Hughes complained in the House of Commons that "we are not being told anything about atomic bombing".[198] A first official history of the British program was written in 1953, but never made public and remained for official use only, notably because it contained "controversial references to individual Americans and to the Canadian Minister" which could have hurt British diplomatic relations.[199] For a full account of British policy, the public would have to wait for two decades, long after the death of most of the key actors.[200] The strict regime of secrecy surrounding nuclear affairs still meant that Parliament was entirely dependent on the executive for information, and vulnerable to exclusion or distortion of policy information.

How much secrecy surrounded action policy? A lot, and, as such, it excluded external controllers. As historian Daniel Salisbury noted, annual Defence statements were not particularly informative about

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[197] Salisbury, *Secrecy, Public Relations and the British Nuclear Debate*, 18.
[198] Intervention by Mr. Emrys Hughes, 24th March 1952, HC Hansard,vol. 498, column. 23.
[199] John Ehrman, *The Atomic Bomb*, 1953, available in PREM 11/783, TNA; Letter from Norman Brooks to Winston Churchill, 12th March 1954, Secret, PREM 11/783, TNA.
[200] The first full official account came in the 1970s, with the publication of Margaret Gowing's official history. On the origins of these books, I refer to Lorna Arnold, "A Letter from Oxford: The History of Nuclear History in Britain," *Minerva* 38, no. 2 (2000): 201–19.

British nuclear policy choices; the "height of publicity' in the 1952-1958 period was the 1957 Defence White Paper which dedicated "almost a page" to the British arsenal.[201] Generally speaking, it is unclear how well-informed MPs were about nuclear targeting or the state of the British arsenal. The public clearly was not well-informed – the *Manchester Guardian* estimated the British stockpile had "at least a thousand atomic bomb".[202] At the same time, Randolph Churchill, MP, could tell the American Chamber of Commerce in November 1958 that "Britain can knock down twelve cities in the region of Stalingrad and Moscow from bases in Britain and another dozen in the Crimea from bases in Cyprus", a rather more accurate, albeit optimistic, estimate.[203] In any case, no information had been given to the parliament about the size of Britain's stockpile,[204] nor its general targeting policy – though it was apparently assumed to be counter city, while the Air Force in fact considered the "primary role" of the V-bomber force to be counterforce.[205] Parliament remain excluded from exerting control over action policy.

What about force development policy? Two specific policy issues can be identified: the decision to acquire thermonuclear weapons, and the selection of test sites. In both cases, it is clear that secrecy distorted Parliament's control. Churchill first tasked Cherwell with investigating H-bombs in February 1953, a few months after the first US test.[206] Research started in Aldermaston but, as it was ongoing, the Castle Bravo test changed the character of debates about atomic weapons. Opponents, notably from the Church, came out in vocal opposition to nuclear weapons, and H-bombs more specifically.[207] Nevertheless, the project moved forward. By July 1954, a decision was made, but only known to the

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[201] Salisbury, *Secrecy, Public Relations and the British Nuclear Debate*, 21–22.
[202] The correct number was around 50. Cited in John Simpson, *The Independent Nuclear State: The United States, Britain and the Military Atom.* (London: Palgrave Macmillan, 1983), 289, fn. 77.
[203] As Freedman notes, it is not clear whether he knew that, or inferred it from the number of bombers. Cited in Lawrence Freedman, "British Nuclear Targeting," in *Strategic Nuclear Targeting*, ed. Desmond Ball and Jeffrey T Richelson (Ithaca, New York: Cornell University Press, 1986), 113–14.
[204] Estimates of stockpile, and of bomb production rates, were considered to be of "the greatest secrecy", so much that papers related to these were sent to the interested Ministers only a few days before meetings, "in the special brown boxes to be opened by Ministers personally", with a note insisting on the importance of secrecy, and had to be returned "immediately after the meeting". Note by Norman Brook for the Prime Minister, 2nd February 1953, Top Secret, CAB 21/4053, TNA.
[205] S. J. Ball, *The Bomber in British Strategy: Doctrine, Strategy, and Britain's World Role, 1945 - 1960* (Boulder: Westview Press, 1995), 90.
[206] Lorna Arnold and Katherine Pyne, *Britain and the H-Bomb* (Basingstoke: Palgrave, 2001), 37.
[207] "Church challenges H-bomb. Dean attacks secrecy on Bikini disaster", *Daily Worker*, 22th March 1954; Grant, *After the Bomb*, 77–81.

Cabinet – reunited in full for once, a major difference with Attlee's 1947 decision.[208] No one outside this close circle was included in the deliberation process. Parliament certainly was not.. Doubts, however, were "expressed about the feasibility of keeping secret, for any length of time, a decision to manufacture thermos-nuclear weapons in this country".[209] These doubts explain that the decision was announced to the public a few months later, through a sentence in the February 1955 Defense White paper. [210] In a sense, it was less clandestine than the A-bomb project as the parliament was informed before the project reached its conclusion. Nevertheless, conditions for legislative control were hardly present. The Parliament could only deliberate on the decision *a posteriori*, unaware that a deliberation was taking place in mid-1954, and this with limited information about its nature.

First, for information on the cost of the H-bomb project, Parliament would have to rely on estimates. Though nuclear weapons now had their own budgetary inscription, the Government still "refused to disclose" the exact figures "even to Parliamentary Committees in confidence".[211] Even before a formal decision on the project was reached, arrangements had been made privately with the Treasury to ensure secrecy over spendings related to the procurement of resources deemed essential for the H-bomb.[212] This is not a trivial matter: H-bomb acquisition had been justified with the argument that costs would remain limited, and that "the capital cost should not exceed £10 millions".[213] According to official historian Lorna Arnold, the total cost, even in 2001, remains almost impossible to assess.[214] Therefore, a key justification of the project could not be subjected to public scrutiny.

Second, confronted with the growing controversy around nuclear weapons following the Castle-Bravo test, the British government launched a campaign to tame public outcry over the hydrogen bomb, using a combination of secrecy and public relations. Considering that "information concerning hydrogen

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[208] Jones, *The Official History of the UK Strategic Nuclear Deterrent, Vol.1*, 31.
[209] Prime Minister's Cabinet, "C.C.(54) 48th Conclusions (8th July, 1954 – 11.30 a.m)", 8th July 1954, Top Secret, PREM 11/797, TNA.
[210] Arnold and Pyne, *Britain and the H-Bomb*, 63.
[211] Note for the Prime Minister, 11th May 1960, PM/60/57, Top Secret, PREM 11/3153, TNA.
[212] Minute for the Prime Minister, 9th April 1954, Top Secret, CAB 21/4053, TNA. Lord Salisbury had indeed made the case for the stockpiling of heavy water and thorium in advance of the decision. Note of a Meeting of Ministers, "Atomic Energy Development", 13th April 1954, Gen.464/1st Meeting, Top Secret, CAB 130/101, TNA.
[213] Notes from a Cabinet meeting, CC (54) 48th Conclusions, 8th July 1954, Secret, CAB 128/27, TNA.
[214] Arnold and Pyne, *Britain and the H-Bomb*, 262, fn. 25..

warfare must be handed to the public with forethought and care", the government did not hesitate to expel a "Scandinavian gentleman (…) for exhibiting horror pictures of the atomic bursts on Japan".[215] In March 1955, the Strath Committee submitted its report to the government on the vulnerability of the United Kingdom to H-bombs. The devastating report found that Great Britain could not be safe from thermonuclear destruction, and that a handful of H-bombs would be enough incapacitate the country.[216] Some of the conclusions reached the press, at the great despair of the MoD who had been "under instructions to take special precautions to preserve secrecy".[217] The report itself would remain classified, and the government even informed the BBC that programs about the H-bomb destructivity considered contrary to the "public interest" might be banned by ministerial order.[218]

As British officials publicly moved toward thermonuclear acquisition, they also sought to restrict information about the actual implications of those weapons, as well as their actual financial costs for the British state. A consensus in favor of thermonuclear development existed among MPs at the time, in favor of thermonuclear development, and the justifications advanced by Churchill were not challenged.[219] What did not exist, however, was a proper legislative control. Information about decisions was available, but deliberation was distorted as information on the policy were obfuscated. Neither oversight, nor accountability, was possible without key information which would have allowed MPs to properly assess the policy.

A similar process can be observed in the case of test sites selection. After Monte-Bello, British officials selected three different sites for nuclear tests. This time, important information was made available earlier. Nevertheless, secrecy formally excluded Parliament and any other external actor from controlling policy choices, including diplomatic trade-offs, made in that regard. First, in late 1952, the

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[215] Minute for Mr. Strath, "Information for the public on hydrogen warfare", 23rd March 1955, J.F.G./55/26, Top Secret, CAB 21/4053, TNA.
[216] Jeff Hughes, "The Strath Report: Britain Confronts the H-Bomb, 1954–1955," *History and Technology* 19, no. 3 (September 2003): 257–75.
[217] Letter from Norma Brook to the Minister of Defense, 7th March 1955, Secret, CAB 21/4053, TNA.
[218] Hughes, "The Strath Report," 273.
[219] Andrew J. Pierre, *Nuclear Politics: The British Experience with an Independent Strategic Force, 1939-1970* (London: Oxford University Press, 1972), 102; Len Scott, "Labour and the Bomb: The First 80 Years," *International Affairs* 82, no. 4 (July 2006): 688.

British selected a new site in Australia, dubbed Emu Field, located next to the Woomera testing range.[220] The proximity offered a convenient cover story. Anyone curious about renewed activities in Woomera would be told that it was simply "normal rocket range work". It was decided that "if and when speculation arises as to the high level of activity, there would be an arranged leak about an expendable pilotless bomber".[221] An official declaration came only in July 1953, when the site was already being built. After Emu Field, the UK looked for a new site in October 1953. The idea of a permanent test site in Australia germinated. Using American nuclear test sites was now out of the question. This would not guarantee the UK an access to US "restricted data" while "our use of an American ground would, however, inevitably enable the Americans to obtain considerable information about our weapons under test".[222] It would lead to the building of the Maralinga test site, in the middle of the Australian bush.

This time, British officials knew they would not be able to keep their plan entirely secret. Members of the delegation who had been to Australia in connection with the tests would have to join the reconnaissance and "may well be recognized" thus revealing the secret plan.[223] Crossed-out sentences from a draft inform us that the UK initially intended to bet on "the fact that the Ministry of supply already has well established connections with Australia on the Woomera range [to] provide some measure of cover for the visit of this team".[224] In spite of this reasonable opportunity for a cover, Cabinet officials decided that a public announcement would "be preferred to any fiction (…), which was always liable to exposure".[225] Officials insisted: the communiqué about the delegation's visit had to include the word "atomic" – and not simply "a matter of common interest", as had been suggested, as this would be "an open invitation to the press" to guess what the matter was.[226] It seems, then, that this time proper

[220] The site had been in the build-up since 1946, and used since 1950 as a UK guided-missile testing site See Peter Morton, *Fire across the Desert: Woomera and the Anglo-Australian Joint Project.* (Canberra: AGPS Press, 1989).
[221] Ben Cockram to the Prime Minister, cited in Elizabeth Tynan, *The Secret of Emu Field: Britain's Forgotten Atomic Tests in Australia* (Sydney: NewSouth Publishing, 2022), 42.
[222] Additional notes "A Permanent Proving Ground for Atomic Weapons", 1954, A.E.(H)(54), Top Secret – Guard, AVIA 65/869, TNA.
[223] Minute from the Secretary, 18th November 1954, Top Secret, AVIA 65/869, TNA.
[224] Draft "Establishment of a Permanent Proving Ground for Atomic Weapons", undated, Top Secret, AVIA 65/869, TNA.
[225] Minutes of meeting by the Cabinet Official Committee on Atomic Energy, 16th November 1954, A.E.(0)(54)16th Meeting, Top Secret, AVIA 65/869, TNA.
[226] Minute from Ministry of Aviation, 19th November 1954, Top Secret, AVIA 65/869, TNA.

information was given about the planned policy. However, some important details were kept secret, notably the fact that the MoS team was sent to discuss not "possible future tests" in Australia, but the establishment of a *permanent* base. The original announcement mentioned only "future tests". To British officials, it was admitted that once Maralinga's inclusion in the Prohibited area was announced, "there [would] be no need for any secrecy about the fact that UK personnel are operating in the area".[227] But they recognized that the Australian government faced a different problem and "would find the greatest difficulty in getting their public opinion to accept a permanent proving ground". They "had to give assurances that Totem was purely a one-time affair, without any commitment for the future". For British officials, "the best prospect seemed to be that they might be got to agree to some arrangements which would in fact be permanent, though not openly admitted [it] to be so."[228]

This apparent candor over Maralinga also served as a cover for the preparation for new tests at Monte-Bello, which was made necessary by the delays in weapon developments in the years 1955-1956.[229] But publicity about nuclear testing, in 1956, was considered a "very explosive subject".[230] Second, these tests were not thermonuclear, but as the official historian of British nuclear testing writes, they "*were* undeniably connected to the thermonuclear trials", a sensitive topic in Anglo-Australian relations.[231] The British MoS was well aware of this and noted that "it would be inadvisable to lay emphasis on this aspect of the trials".[232] For the UK, the "main problem" was "how far we can restrict publicity on Mosaic (…) and how much publicity we can offer on Buffalo as a quid pro quo to the Australians for agreement to soft-pedal on Mosaic."[233] Finally, the last series of British tests took place on the Malden Islands, in Kiribati. Anthony Eden, then prime minister, was anxious to keep this secret, aware that public opinion was still sensitive on the subject of the H-bomb.[234] This secrecy worried members of the MoS, whose

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[227] Report by MOS team, "Construction of a permanent atomic proving ground in Australia", 30th December 1954, Top Secret, AVIA 65/869, TNA.
[228] Minutes from a meeting by the Cabinet Ministerial Committee on Atomic Energy, 23rd June 1954, A.E.(M)(54) 2nd meeting, Top Secret, AVIA 65/869, TNA.
[229] Arnold and Smith, *Britain, Australia and the Bomb*, 107–8.
[230] Letter from R.G. Elkington to W.H. Wheeler, "Dissemination of Information Concerning Atomic Trials", 23rd July 1956, AVIA 65/817, TNA.
[231] Arnold and Smith, *Britain, Australia and the Bomb*, 109.
[232] R. G. Elkington, cited in Arnold and Smith, 109.
[233] Minute from G.A.C Witheridge, 29th March 1956, AVIA 65/817, TNA.
[234] Arnold and Pyne, *Britain and the H-Bomb*, 97.

minister urged for an announcement.[235] As noted in a memorandum from the 1st of June 1956, "the concealment of preparations had become increasingly difficult", and moreover "the absence of an announcement is causing difficulty to the American Government, whose good will is of crucial important to the operation" since the sovereignty of the Christmas Islands was disputed between the two countries. And this was not even all: an official report by the Medical Research Council on the effects of radiation on populations was about to be published.[236] On the 7th of June, Anthony Eden announced it to the House of Commons, stressing that the report that would be issued on the 12th of June had been "fully taken into account".[237] The last series of British atmospheric testing was now officially announced, and took place between May 1957 and September 1958.

What the story of British test site selection shows is that, like for the H-bomb, the new regime of secrecy did augment Parliament's ability to control nuclear policymaking, but still restricted its ability to steer policy choices. Excluded from decision-making, and informed only in retrospect, its power of control was restricted. Arguably, regarding test sites, the intention was not to keep secrets from Parliament, but more generally from the Australian and international audience. The result, however, was the same: due to British officials' anxious desire to keep their choices secret, Parliament could not control decisions related to test sites, except in retrospect, making contestation impossible.[238] The initiative for nuclear policy, thanks to secrecy, remained always in the executive's hands. It must be noted that declaratory policy could be controlled by the parliament, as debates over nuclear policy were now possible. In that regard, there existed a consensus over the deterrent posture of the United Kingdom, which was announced as the main nuclear strategy in 1954 Defence White Paper.[239] MPs could not, however, truly control the correspondence between the stated goals actual capabilities of the arsenal, restricting the value of controlling declaratory policy.

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[235] Arnold and Pyne, 101.
[236] Memorandum by the Secretary of State for Foreign Affairs, "Nuclear Tests", 1st June 1956, n°C.P(56)131, Top Secret, CAB 129/81, TNA.
[237] Arnold and Pyne, *Britain and the H-Bomb*, 103.
[238] Accountability for the harm caused by the tests was made impossible by the regimes of secrecy, as discussed in the next chapter.
[239] Pierre, *Nuclear Politics*, 92.

From 1947 to 1958, the British secrecy regime evolved. With the program starting in full clandestinity, the secrecy regime began as a particularly strict one. It evolved over the years when confronted with the problem of the growing awareness of their program, and the difficulty of maintaining control over information, British officials went public. The amount of available information did not change very much during the year 1952, but state officials' recognition of the nature of their policy led to a deep policy change. Suddenly, British officials were talking about the bomb. Publicly acknowledging the program's existence did not lead to a democratization of legislative control, however. Parliament still lagged behind the executive, unable to steer a policy on which it possessed very little information. The actual level of spending, as well as the details of the policy and strategy choices made by officials, remained shrouded in secrecy. Parliament had to trust the Government on – almost – all counts. This situation continued long after 1958, as the Chevaline program shows.[240]

b. Legalizing the clandestine regime: The French revelation process and its aftermath (1958-1968)

In a similar fashion to the British, the French nuclear secrecy regime experienced a major change as it approached its first nuclear test, undergoing a process of revelation which led to a relaxation of secrecy regulation. Clandestinity was not the policy anymore, and the French nuclear ambitions became public. However –again, much like to the British case – this did not suddenly give the parliament real control over nuclear policy. Things changed, and its power of control rose as nuclear policy legalized. Nevertheless, it remained a "special" domain of policy, with its own exceptional regulation keeping unauthorized actors at a distance and restricting the parliament's knowledge of the executive's actual actions.

[240] The Chevaline program, which consisted in a large-scale modernization effort, almost constituted a "hidden nuclear program" from 1967 to 1982. The existence of such program remained concealed from the public's eyes, which did not ignore that the state had a nuclear policy, but would not be informed about its exact content. John Baylis and Kristan Stoddart, "Britain and the Chevaline Project: The Hidden Nuclear Programme, 1967–82," *Journal of Strategic Studies* 26, no. 4 (December 2003): 124–55; Salisbury, *Secrecy, Public Relations and the British Nuclear Debate*.

i. *The regime of secrecy: the perpetuation of structural barriers to information*

In a report issued in December 1957, the *Cour des Comptes*, France's budgetary oversight institution, noted that it found some strange inconsistencies in the Defence budget, particularly in the "Special Studies" section. Cautiously, its redactor specified that "what this chapter concerns can be secret", before noting that this section was simply purely "incomprehensible". Meticulous, he decided that an investigation was in order. The results of his inquiry are quite surprising, as they reveal what was highly secret at the time. Not only did it conclude, without a doubt, that the CEA was building an atomic bomb, but it also reported the existence and date of several secret protocols between the CEA and the military. But even then, the redactor maintained that he could not really comprehend the nature of this section and could not obtain a "valid explanation" from the interested parties about the complex financial movements he assessed. Even the *Cour des Comptes* could not really grasp the extent of the budgetary efforts toward the bomb.[241] Still, it was pretty clear something was fishy. Secrecy could not hold much longer.

Oversight authorities were not the only ones to think so. Pierre Guillaumat found himself in an awkward situation by 1958. He claimed he told Felix Gaillard, who would be the last President of the Council of Ministers of the IVth Republic, that "One day, Buchalet and I will arrive in Matignon's courtyard with a wheelbarrow and say: 'we have an atomic bomb there, what should we do about it?'"[242] Maurice Aicardi, who was Gaillard's head of cabinet tells a rather similar version of Guillaumat's story: "Guillaumat came to me one day and said: we took so many risks that we now need a state decision (…) There must be a political decision which backs us; what we are doing is too visible now."[243] Refusing

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[241] Cour des Comptes, "Note sur la consommation des crédits du budget de 1956 (Défense Nationale – Section Commune)", 11th December 1957, 20180707/35-20180707/36, AN, 19-20. It must be noted, however, that such issues were not exceptional when it came to the Ministry of Defense's budget. In a report from 1958, the Cour des Comptes provided a scathing criticism of the Ministry's budget management, pointing to numerous illegal maneuvers designed to open funds to wage the Algerian war, and described "a permanent will of dissimulation from the parliament". « Rapport complémentaire sur le chapiter 37-01 Dépenses opérationnelles exceptionnelles du Budget de la Section Commune de la Défense Nationale », 26th February 1958, Secret, 20180707/35-20180707/36, AN.

[242] Interview with Pierre Guillaumat, 551AP/13, AN, vol.II, Interview I, 3rd June 1987, 26.

[243] Interview with Maurice Aicardi, 551AP/13, AN, vol.II, Interview II, 26th June 1987, 9.

to take a decision had consequences: the CEA felt it had gone too far in secret, and that it could have to face consequences at one point or another.

The "secret" was slowly being exposed. An article from February 1958, published in *L'Aurore*, was entitled "Yes, France prepares its A-bomb!". The article read: "This is the normal use of the strictly French plutonium currently produced in Marcoule".[244] In April 1958, a surprisingly well-informed article from *France-Observateur* announced that the question was not "is a French bomb in preparation" but "when will we have a first experimental explosion?". The article attributed the revelation to a strange turn of events: in front of the US Under-commission for Atomic Energy, senator Melvin Price had declared that France was constructing a bomb and was about to proceed to a nuclear explosion. The CEA denied the second allegation but not that it was preparing a bomb. The journalist concluded that, consequently, "the French A-bomb was unofficially out of clandestinity".[245] In the face of this growing pressure, interim Prime Minister Felix Gaillard took an official decision in April 1958, signing an order to authorize a nuclear test in 1960. [246] The day after this order was signed, the first ever anti-nuclear demonstration took place in France, on the site of Marcoule, where the plutonium for the bomb was being produced.[247]

The chaotic context in which it was signed tempered the power of the revelation. In the spring of 1958, France was on the verge of insurrection. Charles de Gaulle was called for the Prime Minister position, and subsequently initiated a regime change. The IVth Republic came to an end. The Vth Republic, of which de Gaulle would be the first President, was established in the summer.[248] On August 2nd, 1958,

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[244] Gérard Protois, "Mais oui, la France prépare sa bombe A ! », *L'Aurore*, 1st February 1958.
[245] Monique Senez, "La Bombe « A » française pour cet été ?", *France Observateur*, 3rd April 1958.
[246] Bendjebbar, *Histoire Secrète de La Bombe Atomique Française*, 231. It seems that in July 1956, a similar decision to authorize a nuclear experimental explosion before the 1st March 1960 was drafted, but never signed. French historian Paul Marcus found this draft in the archives of Maurice Bourgès-Maunoury, who was then Defense minister. Interview with Paul Marcus, "(a/s M. Bourgès-Maunoury)", 16th April 1988, 551/AP13, vol.II, entretien XII, 1-2.
[247] Tramor Quémeneur, "L'ACNV (Action Civique Non-Violente) et La Lutte Contre Les Camps," *Matériaux Pour l'histoire de Notre Temps* 92, no. 4 (2008): 57. To give credit where credit is due, it is not in the scientific literature that I first heard about this event, but from a Twitter thread by Michaël Mangeon (https://twitter.com/Mangeon4/status/1481161400324083713).
[248] It is unnecessary to delve further into the specifics of this regime change. For further information, I refer to Grey Anderson, *La guerre civile en France, 1958-1962. Du coup d'État gaulliste à la fin de l'OAS* (Paris: La Fabrique, 2018).

de Gaulle gave a rather vague speech at Marcoule about France's future ambitions, without explicitly mentioning nuclear weapons.[249] Francis Perrin spoke after him, and spilled the beans: in his speech, he declared that France had been working on nuclear weaponry since 1952, because the plutonium piles of Marcoule could not easily serve any other use.[250] This speech remained restricted to a select audience. But it was rapidly followed by the very public controversy over France's intention to test nuclear weapons in the Algerian Sahara, which led to debates at the UN and put the French nuclear program in the spotlight.[251] On October 1958, de Gaulle finally declared that "everyone knows that that we now dispose of the means to ensure a nuclear armament" and that a French test was approaching.[252] In September, the secret BEG/DTN was replaced by the official *Département des Applications Militaires* (Department for military applications, DAM) in the CEA, officializing the CEA's military ambitions. All pretenses had been stripped away by the end of the year. This change in the public stance toward nuclear acquisition affected the organization of the secrecy regime. The desire for clandestinity, which had defined how secrecy was organized, was no more. Consequently, the regime of secrecy changed.

In February 1960, the first French test took place, with much fanfare. Shortly afterwards, an official leaflet was published, containing details of the French program, including a chronology of development. It revealed the existence of the secret 1955 and 1956 protocols, as well as details about the previous and current organization of atomic research in France. It also described the role of the Ministry of Armies in research, and, most importantly, it gave data about the cost of the program.[253] Such efforts came as criticism of ongoing secrecy was increasingly voiced by the public, including by senator Marcel Champeix.[254] The Military Program Law for 1960-1964 included for the first time an official military

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[249] Allocution pronounced at Marcoule, 2nd August 1958, Charles de Gaulle, *Lettres, notes et carnets. Juin 1958 - Novembre 1970*, (Paris: Robert Laffont, 2010), 36.
[250] The CEA scientists knew how to use plutonium for nuclear weapons but had no clear idea of how to use it for civilian uses. Bendjebbar, *Histoire Secrète de La Bombe Atomique Française*, 250–51.
[251] On these debates, please see the next chapter of this dissertation.
[252] Bendjebbar, *Histoire Secrète de La Bombe Atomique Française*, 255.
[253] La première explosion atomique française (Reggan – 13 février 1960), *La Documentation Française,* n°2.648, 21st March 1960.
[254] Marcel Champeix, "A propos de la bombe française. Le vrai problème : Pourquoi le secret atomique ?", *Le Populaire*, 15th November 1959.

nuclear budget.[255] This was the first time that the shape and direction of French nuclear policy was formalized and presented to the public.[256]

Personnel control practices evolved, and practices developed in clandestinity entered the legal framework with the official creation of the Department for Security and the Protection of Secrecy (DSPS) as an autonomous branch of the CEA. This was the result of the general expansion of the CEA's work,[257] which put pressure on the existing security regime which turned out to be unfit for such sudden growth and could not ensure that investigations were completed in time.[258] The DST had asked the CEA to reduce its amount of requests in 1959 due to the unmanageable workload, which led to a "crisis" of the CEA's security system.[259] In an attempt to solve the crisis, in 1961, the CEA decided to expand its autonomy and officialize its security service by creating the DSPS, which was directly attached to the general administrator.[260] In 1963, new protocols were signed with the regular police and military security services, which gave extraordinary power to the CEA, so much that a civil servant from the Homeland ministry described it as project to turn the DSPS into a "parallel police".[261] Agents even had the right to carry weapons, delivered by the CEA.[262] Such a right had been discreetly granted in 1958.[263] The inspectors were in charge of personnel control, and served to ensure the "secret nature" of the CEA's

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[255] Pierre Messmer, "Les Deux Premières Lois de Programme. La F.N.S et Les Projets Concernant l'arme Nucléaire Tactique," in *L'Aventure de La Bombe. De Gaulle et La Dissuasion Nucléaire.*, ed. Institut Charles de Gaulle and Université de Franche-Comté (Paris: Plon, 1985), 95.
[256] On the debates surrounding this law, which evidence the lack of consensus in France, I refer to Grey Anderson, "The Civil War in France, 1958-1962" (Doctoral Dissertation, New Haven, Yale University, 2016), 365–90. See also Cardoni, *Le futur empêché*, 34–49.
[257] Between 1958 and 1966, the CEA personnel will almost double, from 9000 to 29.000 personnel members. Pô, "La DAM Du CEA," 122.
[258] The CEA wanted a 2-month delay, but took around 6 months in practice. Interview with Robert Bessart, former head of security for the CEA's military site (1957-1962), 551AP/13, AN, vol.II, Interview VIII, 13th November 1987, 25.
[259] Note à l'attention de M. Burin des Roziers, 22nd March 1966, AG(5)/1/855, AN.
[260] Handwritten notes, "M. Dhouailly", undated, AG(5)/1/855, AN.
[261] The draft protocol and the resulting protocol can be consulted in 19920172/8, AN. The second version contains a much more careful wording and ensure that the DSPS technically operates under the DST control. Similar complaints that the CEA was creating a "militia" were also voice by police services in charge of the security of Marcoule. Louis Fagon, "Pierrelatte, Marcoule et Le Secret Nucléaire : Organiser l'ignorance ?," in *Mensonges d'Etat. Une Autre Histoire de La Ve République*, ed. Yvonnick Denoël and Renaud Meltz (Paris: Nouveau Monde, 2023), 288.
[262] Protocole relatif aux questions de sécurité entre le Ministère des Armées et le Commissariat à l'Energie atomique, 9th March 1966, n°3405/DSM/200/DR, Diffusion Restreinte, 19920172/8, AN, 9.
[263] Note à l'attention de Monsieur Lung, 15th December 1958, n°3 .291/58, AG/5(F)/329, AN. Guillaumat himself kept a gun in his office. Note entitled "Nomenclature Objets personnels de M. Guillaumat", 21st January 1959, 307AP/223, AN.

work identified as "an essential objective for foreign intelligence service, necessitating a protection against all forms of penetration". They also fulfilled a local intelligence function, as they were tasked with the surveillance of the "political and social climate", including unions.[264] By 1966, this security service had acquired functional autonomy from police services – to a degree which worried the DST which apparently sought (unsuccessfully) to regain control.[265] By 1966, the CEA effectively had its own police service in charge of ensuring nuclear secrecy on the CEA sites, recruited, and armed by its own care, with exceptional powers compared to any other internal security service. Nothing was clandestine about it anymore. In fact, its director even invited an Elysée advisor to see for himself the "originality" as well as the "regularity" of this service.[266] In his report to the Elysée, the advisor concurred: "nothing in its organic structure and functioning seems like it is a service which would act at the margin of the official police or in parallel to it".[267] As exceptional as this service was, everything was legal – though it is not certain it always acted legally.

Regarding the sites themselves, they were still shrouded in secrecy, even though their function in the French nuclear program was not technically a secret anymore. For example, the official function of the Valduc center, where bombs were being assembled, was known, but it remained a highly secret site about which the CEA did not communicate, leading to "psychosis and fantasies" among the local population.[268] As for Marcoule, the site remained so secret that the National Geographic Institute had to request special authorization to map the zone by plane, and its personnel would have to be vetted by the CEA.[269] The sites where the delivery vehicles, the Mirage IV planes, were built were similarly forbidden

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264 Protocole relatif aux questions de sécurité entre le Ministère des Armées et le Commissariat à l'Energie atomique, 9th March 1966, *op. cit.*

265 Handwritten notes, "M. Dhouailly", *op. cit.* Investigative journalist Pierre Péan writes that, in the 80s, such control was effectively re-established, following the nomination, at its head, of a former commissioner from the DST. Pierre Péan, *Secret d'Etat: La France Du Secret, Les Secrets de La France* (Paris: Fayard, 1986), 114.

266 Letter from Dhouailly to B. Ducamin, undated, AG(5)/1/855, AN.

267 Note "Nature, organisation et fonctionnement du Département de la Sûreté et de Protection du secret au Commissariat à l'Energie atomique", undated (c.1966), AG(5)/1/855, AN.

268 SEMIPAR, "Secret Militaire et Participation En Matière Nucléaire - Rapport Final Du Programme SEMIPAR." (Dijon: Université de Bourgogne, January 2013), 3.

269 That they should be vetted *by the CEA* is noteworthy. Indeed, as mentioned in a letter from the National Geographic Institute, some of its personnel did have security clearance, and they assumed it should be enough. But the CEA considered that its own security clearance was necessary, highlighting once again the autonomous nature of the nuclear secrecy regime. Letter from Dhouailly to the Minister of Public Transportation, "Documentation photographique – Zone de Marcoule", 23rd April 1964, DSPS/PAC n°0376, Diffusion restreinte, 19820427/2, AN.

for employees unionized with the CGT, a union close to the Communist Party.[270] In many regards, France was similar to the UK: though the program was legal, information control remained strict.

Compared to the UK, however, France felt less pressured by the US. In the late 50s, the United States had little intention to engage in nuclear cooperation with it. In 1956, Admiral Strauss once again affirmed his country's unwillingness to partner with France on the basis that the US "could not, under existing laws and practices, execute a power bilateral (sic) involving classified material because it could not certify that the French security procedures were as reliable as our own[271]". Not only was France considered unreliable – despite the far-reaching nuclear secrecy reforms it undertook after 1954 – it was long considered too politically unstable for cooperation.[272] In fact, if the US played any role in driving French nuclear secrecy, it was to increase anxiety about espionage risks. The minutes of a meeting with the director of CEA security in 1966, a member of the Elysée secretariat notes that "the reactions of M. Dhouailly [the DSPS director] showed me that, in any case, he was very aware of the risks of American espionage and was taking it into account in the management of his service".[273] Such fears were reasonable: the CIA had two sources inside the French government informing them of the nuclear program, and several aerial photographs of French sites were taken, notably by Corona satellites.[274] By the late 1960s, the nature of the bilateral relations changed, as the US started to see an interest in restarting cooperation.[275] Desiring to keep that cooperation secret, French and US officials engaged in many deceptive practices designed to keep the public from learning about it. To give just one example, one of the first items during a 1973 meeting between Kissinger and Robert Galley, the French minister for Armed Forces, was the precautions taken to ensure secrecy over the meeting.[276]

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[270] Vincent Nouzille, *Des Secrets Si Bien Gardés: Les Dossiers de La Maison-Blanche et de La CIA Sur La France et Ses Présidents, 1958-1981* (Paris: Fayard, 2009), 178.
[271] Memorandum of a Conversation, Washington, January 25, 1956, Foreign Relations of the United States, 1955–1957, Western European Security and Integration, Volume IV, 394.
[272] Baum, "Two's Company, Three's a Crowd: The Eisenhower Administration, France, and Nuclear Weapons,."
[273] Secrétariat général de l'Elysée, Note à l'attention de M. Burin des Roziers, 22nd March 1966, Archives Charles de Gaulle, AG/5/1/855, AN. It is notable that such concerns about Soviet espionage is never explicitly mentioned. It could be because it is obvious, or because the Elysée considered it a lesser risk.
[274] Claude Carlier, "La Surveillance Par Les États-Unis Des Programmes Nucléaires Français Armes et Vecteurs (1960-1966)," *Stratégique* 1, no. 102 (2013): 159–60, 172.
[275] On how this shift happen, see Krige, "Technodiplomacy."
[276] The plan being that, in case Galley's visit were to leak to the press, it should be announced that Galley was here randomly after his plane was diverted on its way back to Tahiti and he decided to seize the occasion to "pay

What can be concluded from this general overview of the French nuclear secrecy regime after 1958 is that, with the revelation process, nuclear secrecy evolved toward more publicity as nuclear policy was now officially acknowledged. However, sites, personnels and policies were still under strict control. That is, the public could know that there existed such a thing as a nuclear policy, but it would struggle to acquire knowledge about it independently considering how controlled information about nuclear policy was.

ii. Legislative control: A Parliament in the dark

The French *action* policy was decided largely out of the parliament's eyes. When it came to nuclear policymaking, de Gaulle believed that "nothing is as good as secrecy".[277] The parliament would not be informed of the exact size and shape of the arsenal – to this day, French presidents still give estimates of the stockpile, rather than exact figures.[278] The first general information about the capabilities of the arsenal would be given to the parliament in a 1970 parliamentary report, and then in 1972 in the first White Paper. It must be noted, however, that the given yields varied.[279] Generally speaking, the exact nature of France's action policy was quite unclear, but it edged toward a catalytic posture, aiming at bringing the United States into the war if needed – an action policy incompatible with the public stance of "independence" put forward by French leaders.[280] Some elements were also purposefully not communicated, such as the fact that "France will not use nuclear weapons on a non-nuclear power and when its territory is not threatened", something the Minister for Armed Forces Pierre Messmer considered "good to know, but bad to say".[281] Generally speaking, public discourse about targeting

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[his] respects" to Kissinger. Memorandum of Conversation with Robert Galley, 31st August 1973, Top Secret, available online at: https://digitalarchive.wilsoncenter.org/document/memorandum-conversation-robert-galley-august-31-1973.

277 "*Rien ne vaut le secret"*, cited in Alain Peyrefitte, *C'était de Gaulle. Volume 3.* (Paris: de Fallois/Fayard, 2000), 120–21.

278 Hans M. Kristensen and Matt Korda, "French Nuclear Forces, 2019," *Bulletin of the Atomic Scientists* 75, no. 1 (January 2, 2019): 51. Ironically enough, US officials, thanks to an insider inside the Council of Ministers, knew the exact French stockpile by 1967 (35 weapons). Nouzille, *Des Secrets Si Bien Gardés*, 195.

279 In the 1970 report, the AN-22 is attributed a yield of 80kt, but in the 1972 White Paper, it is noted at "nearly 100kt". See Bruno Tertrais, "*'Destruction Assurée'*: The Origins and Development of French Nuclear Strategy, 1945-1981," in *Getting MAD: Nuclear Mutual Assured Destruction, Its Origins and Practice*, ed. Henry D. Sokolski (Carlisle, PA: Strategic Studies Institute and U.S. Army War College Press, 2004), 117, fn. 249.

280 Pelopidas and Philippe, "Unfit for Purpose," 259.

281 Letter from the Général Stehlin to the Minister of Armies, "Contribution à la definition d'un concept stratégique français" 9th January 1963, n°38/EMAA/BEG/TS, Très Secret, GR 1 R 58 (3), SHD.

strategies was "rather vague, if not confusing" and revealed little about actual policy choices.[282] In any case, action policy was defined in highly exclusive circles. The Defense Council, which made the decisions, had only a handful of officials. Decision-making in nuclear affairs was "totally exceptional", recalled Messmer, because it "privileged certain military officials compared to many ministers".[283]

MPs were not entirely kept in the dark about the general action policy, since some MPs would be informed about the Mirage IV flight plans and range, and implicitly of the counter-city nature of the strategy – since the plans clearly showed the Mirage reaching Moscow.[284] The problem is that the Mirage could not, in fact, reach Moscow, something known by some among French nuclear officials, but never officially acknowledged.[285] Generally speaking, key information about the nuclear arsenal was kept secret from the parliament, notably an incident during which a Mirage IV took off with a live nuclear warhead under its wings, a maneuver deemed extremely dangerous.[286] De Gaulle himself seemed to have been lied to about certain security issues surrounding the first French weapon, the AN-11.[287]

What about the force development policy? Here, it is useful to look at the same examples used in the British case: the H-bomb decision, and the selection of test sites. On both cases, it is clear that the Parliament's control was restricted by secrecy. Regarding the decision the go thermonuclear, as always with France, it is difficult to identify the moment it was actually made. The 1960 Military Program law, painfully passed through a now (in)famous constitutional device found in art.49§3 of the Constitution, mentioned the building of a nuclear, and then thermonuclear arsenal. The plan was to build the first atomic weapon by 1962, the delivery vehicles by 1963, and an H-bomb by 1966, a plan which would

282 Tertrais, "*'Destruction Assurée,'*" 82.
283 Institut Charles de Gaulle, Compte rendu de la réunion préparatoire du 23 juin 1983, 23rd June 1983, 569AP/105, AN.
284 See, for example, the Mirage IV plans in Joel le Theule's archives, 571AP/9, AN.
285 Pelopidas and Philippe, "Unfit for Purpose," 253–59. According to the General Rhenter, who commanded the Strategic Air Force between 1964 and 1967, the "Mirage IV had one weakness: not being able to go far with certainty". For a nuclear delivery vehicle, this is quite a weakness. Interview with the general Renther, 12th February 1988, 551AP/14, vol.III, interview XIII, 22.
286 Pelopidas and Philippe, 252; Jean Dominique Merchet, "Le Jour Où Un Mirage IV Décolla Avec Une Vraie Bombe Nucléaire...," *Secret Défense, L'Opinion*, June 8, 2015.
287 The AN-11, indeed, had known security issues and was quickly replaced after only a dozen was produced. However, according to General François Maurin, who was the first to be in charge of these weapons on the Mont-de-Marsan base, De Gaulle was being told that everything was going well in spite of their known flaws. Interview with General François Maurin, 24th June 1988, 551AP/14, vol. III, interview XVIII, 18.

effectively "lock-in" France's nuclear program. As Messmer, then Minister for Armed Forces, saw it in 1962 "no government could go back on that program, it is too advanced".[288] It was a clear project for the supporter of the French program, who wished to make nuclearization "irreversible" by advancing fast.[289] This haste would not be without consequences: as Pierre Guillaumat and Pierre Messmer would recognize later, the French strategy eventually "stemmed from the armaments, not the other way around".[290] The plan to build an H-bomb was more or less approved by the parliament in 1960. But once it passed, what oversight did the parliament have?

The extreme secrecy which surrounded all of the CEA's activity meant that even the executive would be informed only in bits and pieces about the process. CEA leadership could and did keep the government in the dark about some of its plans. For example, in 1965, as Prime Minister Pompidou was doubting the rationale for thermonuclear acquisition, it removed all references to "thermonuclear" tests in the preparation of the 1966 test campaign – not to cancel them, but simply to instruct everyone "not to pronounce the word thermo-nuclear" in Pompidou's presence.[291] In this context, one would not expect the parliament to have a clear idea of what was going on. The parliament had a better view over the use of public funds for force development purposes than it did during the clandestine period. Yet, its knowledge was still very distorted. The CEA's military funding remained hard to track as use of multiple budgets continued.[292] The evolution toward a more transparent use of public funds led to the deletion of the "Special studies" chapter. Atomic spending was dispersed throughout three new chapters.[293] Budgets were still largely opaque since the exact use of the funds was kept secret. Parliament was given a budget divided into general chapters with subdivisions into articles to vote on. Ministerial decisions later further

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[288] Memorandum of conversation between Pierre Messmer and Robert McNamara, 29th November 1961, cited in Nouzille, *Des Secrets Si Bien Gardés*, 174.
[289] Joël le Theule, cited in Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, 278.
[290] Institut Charles de Gaulle, Compte rendu de la réunion préparatoire du 23 juin 1983, 23rd June 1983, 569AP/105, AN.
[291] Interview with the Engineer Genera Paul Bonnet, 24th March 1988, 551AP/14, vol. III, interview XV, 20-21.
[292] The program was funded through funds from the military, the CEA itself, and the Prime Minister's office. Commission de vérification des comptes des entreprises publiques, « Rapport complémentaire établi sur certains aspects de la gestion du CEA pour l'exercice 1960 », 123 K. Ext1, Secret, 20110333/7, AN, 3-4.
[293] They distinguished distinguishing between the "Atom" budget, which focused on fissile material, the "Device" (Engin) which was concerned with weapons production, and a section for nuclear tests. Cour des Comptes, Rapports sur les dépenses d'expérimentations et d'armements nucléaires entre 1968 et 1970, undated, 20180707/39, AN, 22.

subdivided articles into "execution articles" which specified the precise amounts. These were not made public. State officials could therefore keep the exact use of the funds secret from the parliament.[294] The CEA's use of public funds was now subject to some control through the *Cour des Comptes*'s public report. The CEA was given the right to review these reports before publication in order to remove any information which might violate secrecy rules or leak strategic information. A procedure was also set up in 1960 which allowed the CEA to "apply, when establishing its accounting, all measures it judges necessary to preserve secrecy."[295] On a more political level the Court's president was also agreed to a request not to send the report to the Finance commission in the Senate and National Assembly without consulting with the delegate minister beforehand.[296]

By late 1962, the rapid growth of the CEA's size and mission led to calls for more control mechanisms. It had been noted, in 1961, that the CEA might be failing some standards of financial management.[297] Gaston Palewski, delegate minister for spatial and atomic affairs, refused to cede too much ground. He considered it essential not to alter the CEA's "indispensable" autonomy although he recognized the need for control. He proposed the creation of a Finance committee, in charge of examining "the general policy of the Commissariat in financial matters".[298] It was created in November 1962, and met for the first time in January 1963. Importantly, its task was not to oversee solely military matters, but all nuclear matters.[299] In a fitting manner, the very first point of its first meeting was a "reminder regarding the notion of secrecy".[300] Every opening superior to 2m Francs was supposed to be examined by the commission. It seems, however, that "secret openings" – that is, requests for funds without specification

[294] Cour des Comptes, "Rapport à fin de décision sur le chapitre 51.90 – Etudes spéciales. Centre d'expérimentaires nucléaires. Budget du ministère des armées. Section commune", 27th November 1968, n°68-684, 20180707/39, AN, 33.
[295] "Rapport complémentaire établi sur certains aspects de la gestion du CEA pour l'exercice 1960", 20110333/7, 20th June 1962, AN, 25.
[296] Compte rendu de la séance de la commission de vérification des comptes des entreprises publiques, consacrées à l'examen du rapport sur les comptes et la gestion du CEA pour l'année 1959 qui a eu lieu le 8 juin à la Cour des Comptes, 9th June 1961, 20110333/7, AN.
[297] "Rapport complémentaire établi sur certains aspects de la gestion du CEA pour l'exercice 1960", *Ibid ,* 47.
[298] Letter from Gaston Palewski to the Minister of Finance, "Mesures de gestion et de contrôle au CEA", 2nd October 1962, n°959, 20110333/7, AN.
[299] Création d'un comité financier auprès du Commissariat à l'Energie atomique, Journal officiel, 28 novembre 1962 – 23 décembre 1962.
[300] CEA Finance Committee, "Annexe au Procès-Verbal de la Première réunion du Comité Financier tenue le 8 janvier 1963", undated, 20110333/7, AN.

of their use – were proposed in front of the committee, as a way of keeping secret the precise nature of the research done inside the laboratories.[301]

This means that, while the H-bomb was being developed, the parliament only had a restricted oversight of force development policy. This was not without consequence. Investment in the program required significant public funds which, without parliamentary oversight, were frequently mismanaged. One such investment was the construction of the Pierrelatte enrichment plant. It must be noted that the construction had been justified on false basis and presented as a necessity for thermonuclear weapons – which it was not.[302] It constituted the "the most considerable investment ever realized in France" at the time. The plant ended up costing much more than expected. Originally estimated at 600m Francs, the cost was rapidly estimated at 4,5b Francs. The *Cour des Comptes*, in its very administrative language, expressed doubts about the sincerity of the first estimate, considering that "it seems difficult to explain that (…) such a large mistake could have been committed". Moreover, the allocations for the plant were never included in full in the public accounts, a decision the CEA justified by claiming knowledge of the cost could allow others to estimate the actual capacity of the plant – something the *Cour* deemed "debatable". It also noted that the decision to separate the budgets between different authorities and chapters "risked making the importance of the global load less easily perceptible".[303] A report from the Ministry of Armies also noted that legislative control over the plant costs was lacking, since "the parliament is not explicitly called to take position over supplementary credits anymore", the credits being taken from a budgetary chapter intended for general spendings, and "whose distribution escaped the parliament's examination".[304] Generally speaking, although the parliament now had the possibility to look at the details of force development policies, practices of obfuscation and more generally the structural secrecy which surrounded anything nuclear inside the French state distorted the view and allowed the executive

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[301] Such secret opening (*ouverture secrète*) appears in CEA Finance Committee, Procès-verbal de la quatrième réunion du Comité Financier tenue le 2 avril 1963, 9th April 1963, Diffusion Restreinte, 20110333/7, AN. It is unclear whether the Committee members were made aware verbally of the nature of the expenditures.
[302] Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, 267.
[303] "Rapport complémentaire établi sur certains aspects de la gestion du CEA pour l'exercice 1960", *Ibid.,* 22-27.
[304] Report for the general controller Vialatte, "La construction de l'usine de séparation des isotopes de l'uranium à Pierrelatte", 8th October 1961, 251/VM/61, Diffusion Restreinte, 9 R 57/3, SHD, 4.

to escape the parliament's gaze.[305] These gave the CEA a great deal of autonomy, even from other services.[306] Control over force development remained restricted. The same can be observed regarding atmospheric test sites selection.

France proceeded only to four atmospheric tests in Reggane. It then moved underground to the In Ekker site, after a failed attempt at creating a site in Corsica but had to leave a few years after Algeria's independence.[307] The island of Moruroa, in French Polynesia, was selected in 1962 to be the next atmospheric test site. De Gaulle was pressuring the military and the CEA to find a site where the weapon designed for the Mirage IV could be dropped from a plane, and where a thermonuclear device could be detonated: "We need to reach this thermonuclear capacity whatever happens so that we can say it. One day maybe we will settle for underground testing".[308] Once again, French policymakers were torn between their urge to flaunt their technological prowess and the need for secrecy to restrict protests. In Polynesia, they would face another problem: domestic protests.

Before Polynesia, French officials scouted different sites, such as the Kerguelen islands, which did not fit their criterions for atmospheric tests. Polynesia was a good candidate but there were not enough alternatives to allow for blunders. This time, unlike in Corsica, French officials established a firm control on information from beginning. General Thiry, in charge of the Central Direction for Nuclear Tests (Dircen) at the Ministry of Armies, was sent to Polynesia in early 1962 under the guise of a member of

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[305] An element which was, also, left secret for years is the role played by English sources in the realization of the French H-bomb. Though some CEA engineers had gotten close to solving this issue, their ideas were not seen as a priority at first. It seems accepted that it is only after an English scientist approach the French military representative at the London embassy and offered to help that the CEA knew it was on the right track. De Gaulle was told about these negotiations only after the fact, to which he reacted by ordering that they be kept totally secret (Jean Guisnel and Bruno Tertrais, *Le Président et La Bombe: Jupiter à l'Élysée* (Paris: Odile Jacob, 2016), 44–46.) Though the story has been told many times by actors now, no archival traces has emerged, and the CEA, through its official historian still refuse to acknowledge it. (See Dominique Mongin, "De La Bombe H Aux Essais Souterrains," in *Des Bombes En Polynésie. Les Essais Nucléaires Français Dans Le Pacifique.*, ed. Renaud Meltz and Alexis Vrignon (Paris: Vendémiaire, 2022), 271–88.).

[306] For example, in 1967, the CEA managed to save some money over Pierrelatte's hazard margin, but decided not to tell anything to the Armies, who partially funded the plant, in order to keep these savings for other parts of the thermonuclear program. Notes from a meeting between Alain Peyrefitte and the CEA's General Administrator, "Questions de Défense", 24th January 1967, Secret, 20110333/6, AN.

[307] Austin R. Cooper, "The Argentella Scandal: Why French Officials Did Not Make Corsica a Nuclear Test Site in 1960," *The Nonproliferation Review*, 2023, Online First.

[308] De Gaulle, cited in Meltz, "Pourquoi La Polynésie ?," 63.

the civil aviation charged with organizing a new region in the Pacific.[309] French officials were worried about local reactions. The situation in Polynesia was understood as rather tense and the possible rise of nationalism – and, consequently, separatism – was high on the list of their worries. In February 1962, as Thiry was preparing for another trip to Tahiti, an intelligence officer warned of the risks of any "act on our side [that] would gravely hurt the Polynesian sensibility".[310] This could reverberate "in France, the UN, and the world".[311] Clearly, French officials were also desperate not to repeat their Algerian experience. The decision to hold future tests in Polynesia was taken in July 1962, but was kept secret for months.[312] During this time a senator asked the government for reassurance on the recently dismissed rumors about a future test site in Polynesia. He was not answered.[313] Neighboring states, particularly New Zealand, were also not informed of the decision. The French Foreign Ministry simply kept saying that nothing had been decided yet – even after Thiry accidentally revealed in May 1963 that a decision had been made.[314] The site's construction was done with little information: the Governorate of Polynesia complained, in late 1962, about an impression of dissimulation regarding the ongoing construction work at the CEP.[315] This does not mean that the local population was unaware of the activities. Well informed journalists started publicizing the rumor, despite the precaution taken.[316] However, intelligence reports outlined that although the Polynesian population seem to have accepted the project of an atomic base in the Gambier, "in the mind of a part of the population, it is not about nuclear experiments but a base for missile launch".[317] In the end, de Gaulle made an official announcement in January 1964. The

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[309] It did not, however, fool American intelligence. Renaud Meltz, "Une Bombe et Un Site," in *Des Bombes En Polynésie. Les Essais Nucléaires Français Dans Le Pacifique*, ed. Renaud Meltz and Alexis Vrignon (Paris: Vendémiaire, 2022), 29–35.
[310] Note du Cabinet militaire du Ministère des Outre-Mer, "Sensibilité politique des T.O.M du Pacifique", 14th February 1962, Secret, GR 13 R 133/1, SHD.
[311] Note de renseignement, "Menaces pesant sur la Polynésie Française", 17th January 1962, Secret, GR 13 R 133/1.
[312] Meltz, "Pourquoi La Polynésie ?," 43.
[313] Renaud Meltz, "Les Essais Nucléaires En Polynésie Française. Du Secret Au Mensonge.," in *Mensonges d'Etat…*, 275.
[314] Sarah Mohamed-Gaillard, *L'archipel de La Puissance? La Politique de La France Dans Le Pacifique Sud de 1946 à 1998* (Bruxelles: Peter Lang, 2010), 308.
[315] Rapport du capitaine de vaisseau Lapostolle, décembre 1962, Annexe V, GR 13 R 133/1.
[316] For example, "Une base française d'essais atomiques dans le Pacifique ?", *Le Monde*, 18 septembre 1962
[317] Fiche à l'attention de M. le directeur de Cabinet, 15th of October 1962, n°1495/CAB/MIL, Secret/Confidentiel, 19940390/44, AN ; See also Réactions de l'opinion publique polynésienne devant le projet d'installation d'une base atomique dans l'archipel, 14th August 1962, GR 13 R 133/1, SHD, Bulletin de renseignements mensuel, Département et Territoires d'Outre Mer, Août 1962, 20th September 1962, n°1382/CAB/MIL/S, Secret, GR 13 R 133/1, SHD.

parliament, for its part, was not involved in the project. As for the British Parliament, it would only be informed after the decision had been made, and the work was about to begin. Simply put, it was excluded from the decision, and could only exert a posteriori control.

Much like the British case, legislative control over French nuclear policy was severely hampered by secrecy. Excluded from action policymaking, it could only control force development policy in a restricted manner. Though able to vote for – and, implicitly, against – military budgets, it received distorted information about the content of these budgets. The now public nature of the nuclear policy meant that it could have a say in declaratory policy. But as for the British MPs, there was limited value in this oversight as the parliament lacked the means to control the consistency between the publicly stated goals of the arsenal and the actual existing capabilities. After 1958, the nuclear secrecy regime was sharply transformed, but certainly did not disappear. In fact, practices developed outside of the legal framework while the program was clandestine, were perpetuated rather than re-entering legality. Instead of changing the nuclear secrecy regime to fit the legal framework, the legal framework was transformed to fit the requirements of nuclear secrecy. The similarity in the British and French experience raises a question: what happened in the case of Sweden, were constraints linked to the development of the program never posed themselves as such?

c. From clandestine to public – and back: Sweden's strange nuclear policy

The Swedish story, after 1954, diverges widely from the British and French experience for two main reasons. First, unlike France and the UK, Sweden experienced a lively public debate about nuclear acquisition *before* finishing its program. Second, and arguably as the result of the public debate, the Swedish government decided to abandon its nuclear program before it was completed. How and why, this happened has been explored in detail elsewhere.[318] This subsection is concerned only with the

[318] Notably, in Anna-Greta Nilsson Hoadley, *Atomvapnet som partiproblem: Sveriges socialdemokratiska kvinnoförbund och frågan om svenskt atomvapen 1955-1960* (Stockholm: Almqvist & Wiksell International, 1989); Thomas Jonter and Emma Rosengren, "From Nuclear Weapons Acquisition to Nuclear Disarmament – the Swedish Case," *Medicine, Conflict and Survival* 30, no. sup1 (July 31, 2014): 46–63; Jonter, *The Key to Nuclear Restraint*; Emma Rosengren, "Gendering Nuclear Disarmament: Identity and Disarmament in Sweden during the Cold War" (Doctoral Dissertation, Stockholm, Department of Economic History and International Relations, Stockholm University, 2020).

evolution of the Swedish nuclear secrecy regime as the program became an object of public debate, and with the development of legislative control during this period. Because things moved fast, and along very different lines than in the French and British case, this last subsection is organized in a narrative manner, combining the study of the evolution of nuclear secrecy with its impact on legislative control. It focuses, first, on the period of public debates, from 1954 to 1958, when nuclear policy became an issue for parliamentary politics. Second, it looks at how this issue somehow escaped the parliament's grip again after the decision *not* to produce nuclear weapons was taken (at least temporarily) in 1958. I argue that the continuing secrecy over nuclear research restricted legislative control, even after the program was officially over.

i. The emergence of a public debate: the rise of legislative control over nuclear policy

How, first, did the boundaries of the Swedish nuclear secrecy regime evolve after 1954? Externally, 1954 marked the beginning of the Atoms for Peace program, which led to a re-evaluation of what should be considered classified in Sweden. At the insistence of AB *Atomenergi*, many patents regarding the civilian uses of atomic energy were publicized.[319] This significantly reduced the overlap between military and civilian secrecy and reinforced the distinction between the two fields. Second, 1954 was also the year of the catastrophic Castle Bravo test, "the shot heard round the world" which raised global awareness of the effects of nuclear weapons.[320] Castle Bravo had immediate effects on public debates over nuclear weapons in Sweden. It led to the declassification and publication of measurements of atmospheric radioactivity carried out since the early 50s by Rolf Sievert and his team. The idea was first suggested by the *Atomkommitté*, which hoped that such results could reassure the public.[321] Upon consulting the less than reassuring results of the study, Torsten Schmidt, the military representative in

[319] For example, on the 23rd November 1954, a list of 117 demands for patent declassification was presented to the Atomkommitté for decision. Such number is not only unprecedented, it also never happened again during the studied period. Föredragningslista nr 63 vid sammanträde med Atomkommittés arbetutskott tisdagen den 23 november 1954, 23rd November 1954, AK Archives, AIIa:2, RA. Bilaga till protokoll nr 67 vid sammanträde med atomkommitténs arbetutskott den 26 april 1955, Hemlig, A Ia: 12, RA; Letter from Gösta Funke to Hugo Larsson, 10th May 1955, Hemlig, FOA Archives, E 3a:13, RA.
[320] Keith M. Parsons and Robert A. Zaballa, *Bombing the Marshall Islands: A Cold War Tragedy* (Cambridge ; New York, NY: Cambridge University Press, 2017), 7.
[321] Bilaga till protokoll nr 61 vid sammanträde med Atomkommitténs arbetutskott den 23 april 1954, Hemlig, A Ia:12, RA.

the Commission, realized they might instead be used for negative propaganda purposes.[322] After some debate, the figures were eventually published in 1956.[323] The scope of nuclear secrecy was reducing by the year. But the most important secondary effect of Castle Bravo was to put the atomic bomb, for the first time, on the agenda of Sweden's public debates.

In May 1954, nuclear weapons were discussed in front of the parliament for the first time, though in an oblique manner. The Caste Bravo test had raised awareness and anxiety about both nuclear fallout and nuclear weapons more generally. In a lengthy address to Parliament, Prime Minister Erlander discussed both issues, stating upfront that the use of nuclear weapons in a future war was likely, and that Sweden should protect itself from it. Therefore, he declared FOA was conducting investigations into protection against nuclear weapons. However, he remained entirely silent about research into the *production* of nuclear weapons, even after one MP asked Erlander to "let us ensure that in this country, the idea of offensive nuclear bombs is not entertained!".[324] Later that year, Nils Swedlund, the Supreme Commander of the Swedish Armed Forces, published a report on Sweden's future defense. In it, he took a clear position in favor of the acquisition of tactical nuclear weapons. As historian Thomas Jonter notes, the report truly launched the public debate, in large part because before its publication, journalists simply lacked information about the problem. Newspapers finally had content to write about.[325] Those in favor of it became more vocal – Richard Åkerman, by 1955, noted that he now "directly sa[id] that we want the atomic bomb"[326]– and opposition started to build.

The debate, to a certain extent, affected the boundaries of secrecy over nuclear weapons plan: first of all, it put center stage the question of nuclear acquisition, a question that British and French policymakers had managed to keep in the background. This came as a result of the parliament's own efforts. In the summer of 1955, it put together a Parliamentary commission with the goal of investigating

[322] Letter from T. Schmidt to Atomkommitté members, "Bestämning av luftradioaktivitet", 10th November 1954, Hemlig, HF:18:1, FOA archives, Ö IV:4-5, RA.
[323] Rolf M. Sievert, "Records of Gamma Radiation from the Ground and Beta Radiation from Radioactive Debris in Sweden, 1950–1955. Part I," *Tellus* 8, no. 2 (January 1, 1956): 117–26.
[324] Jonter, *The Key to Nuclear Restraint*, 132.
[325] Jonter, 134.
[326] Richard Åkerman's diary, 28th April 1955, Richard Åkerman's archives, vol.2, RA.

defense-related issues, named the *Försvarberedningen*.[327] Though it was not solely about nuclear weapons, it explored the issue thoroughly.[328] This restricted committee was briefed by miliary leadership and FOA researchers on the strategic implications of nuclear weapons, as well as on the technical challenges and costs of their production.[329] Such briefings were submitted to a certain control: before his intervention in front of the committee, the Supreme Commander enjoined the head of FOA's section 2 to be cautious about what they would reveal.[330] But even with this caveat, a select number of Swedish MPs would, for the first time, be introduced to official thinking about nuclear policy, and briefed about possible pathways toward nuclear acquisition. The briefing even included a mention of the possible acquisition of nuclear weapons from the US.[331] Such communication, it must be noted, was not synonymous with informing the parliament about FOA's research. That is, the MPs were given information about how nuclear weapons could be built, and how much it would cost – a level of information crucial to make an informed decision – but not about how much had already been spent or what was going on in FOA's laboratories. Ambiguity persisted as debates were taking place behind semi-closed doors inside the Social-Democratic Party. Things could have remained in those spaces, notably because no mention of atomic weapons was made at the party's congress in 1956, nor during the electoral debates.[332]

However, by 1957, the Prime Minister had come to believe that the question should not left to a small group of people in secrecy but had to be brought into the public space and put before the parliament. He had the opponents of a nuclear weapons program, notably Inga Thorsson, to do so in December 1955.[333] After internal debates inside his own party, Erlander was becoming less convinced of the feasibility of nuclear acquisition, seeing both the strength of the internal opposition and the technical challenges of

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[327] Björn von Sydow, *Kan vi lita på politikerna? Offentlig och intern politik i socialdemokratins lending 1955-60* (Stockholm: Tiden, 1978), 39.
[328] It also discussed issues of military cooperation or other weapons, such as rockets, development, for example. See Försvarberedningen sammanträde, 7th May 1956, Richard Åkerman's archives, vol.5, RA.
[329] See Notes for *Försvarberedningen*, "Atomstridsmedlem och deras plats i försvarplanänlaggninen", 1st March 1956, Hemlig, Richard Åkerman's archives, vol.5, RA.
[330] Agrell, *Svenska Förintelsevapen*, 143.
[331] Utkast till disposition av underlag till föredragningar 1. och 5. mars 1956, 11th February 1952, Hemlig, Försvarsberedningen Arkiv, volum 1, RA, Marieberg.
[332] Sydow, *Kan vi lita på politikerna?*, 39.
[333] Tage Erlander, *Dagböcker. 1955* (Hedemora: Gidlund, 2001).

program.[334] Moreover, the forceful campaigning in favor of nuclear weapons by the military forced Erlander to handle this decision in public. In January 1957, Hugo Larsson, the head of FOA, publicly announced that it could be possible to produce nuclear weapons by 1963 or 1964. This was the first announcement of its kind. Although it did not reveal anything about the state of technical preparations inside FOA, it hinted that some had at least taken place. The same year, the Supreme Commander doubled down in a new report, advocating for nuclear weapons as a "self-evident choice".[335]

But the decision to decide the question publicly was not self-evident: for the Military, the temptation had been strong to retain it into a small circle. For the Navy's chief of staff, in 1956, there was "no doubt" that "the military interest was in not debating the atomic bomb".[336] For a while, some argued that no decision had to be taken yet and that the matter could wait for some years. This suggests a certain desire to keep the matter under wraps for some time and to continue the work without explicitly acknowledging it. Erlander seemed enticed by such plans for some time, though he eventually changed his mind.[337] It also seems that contact with the US, starting in 1956, made it clear that a declared intention to acquire atomic weapons would end technical cooperation between the two countries – though such cooperation would continue if Sweden refrained from going public and pursued those weapons secretly.[338] Similarly, in great secrecy, FOA was advancing toward nuclear acquisition. For example, it remained unknown that, in 1957, FOA conducted two (conventional) explosions on the Northern Swedish forest site of Nausta, with the purpose of studying the effects of atomic bombs by simulating the conditions of a nuclear explosion using several tons of TNT. This was not the purpose given to the public. In fact, concealing the true nature of the test was considered as important as concealing its results.[339] Aware that such an explosion might not be discrete, FOA released a communiqué ahead of

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[334] Jonter, *The Key to Nuclear Restraint*, 123–24, 158–61.
[335] Jonter, 80–81.
[336] Magnus Hjort, *"Nationens livsfråga": propaganda och upplysning i försvarets tjänst 1944 - 1963* (Stockholm: Santérus, 2004), 241.
[337] Notes from a meeting, entitled "Atomåldern", 1955, Tage Erlander Archives, 4.2 :005, ARAB, 7.
[338] Colonel Wilber V. DeLoach, "Memorandum for the Record", 1st February 1956, cited in Paul M. Cole, *Sweden without the Bomb: The Conduct of a Nuclear-Capable Nation without Nuclear Weapons* (Santa Monica, CA: Rand Corporation, 1994), 37–38.
[339] Letter from Bengt Grabe to Ulf Eriksson (FOA), 29th May 1957, Hemlig, H2251-2092, FOA Archives, E 3a:18, RA.

the events, presenting the test as an experience to test the resistance of certain materials.[340] As often, this was not incorrect: many materials were indeed exposed to the blast.[341] However, that it was part of nuclear weapons research was left unsaid, even though many documents referred to the test as being part of the "atomic weapons studies". Special instructions were given to all participants to make sure they would not risk attracting unnecessary attention to the event, notably by ordering military personnel to wear civilian clothes on their road to Northern Sweden.[342]

The 1954-1958 period shows a major evolution in Swedish officials' public discourse and the movement of nuclear policy into the spotlight. While the parliament had barely any control over FOA's nuclear project before, it suddenly acquired control over action policy, defined in that case as "to have, or not to have nuclear weapons". With Erlander's decision to put the question to the parliament, the Swedish case became very different from the British and French ones, where the parliament was called to vote only when a first device had exploded. Deciding the issue in public, instead of doing it in private under cover of the nuclear secrecy regime, meant that the parliament now had effective control over action policy. However, paradoxically, it did not acquire much control over force development policies, if we define it as control over research and development inside FOA, which remained highly secret. At best, the parliament now knew that it was interested in acquiring nuclear weapons, but only had a distorted impression of development policy. It did not know how far the project had progressed, how much it had cost, or what future plans were. This disconnection between control over action policy and force development policy would be of major importance during the post-1958 period.

ii. *Ceasing to talk about the bomb: continuing practices of secrecy in Swedish nuclear policy (1958 – 1972 … and after)*

In the summer of 1958, two proposals were eventually presented to the parliament: a "device" (*läddning*) program, which would have involved the construction and production of nuclear weapons, and a "protection" (*skydd)* program, which would only pursue research for protections against nuclear

[340] Press release from FOA, "Försok av hemlig natur", FOA Archives, E 3a:18, RA
[341] See Armétygförvaltningen, Rapport angående prov med tygmaterial och ammunition i samband med sprängning i Övre Norrdland 1957 för Atomvapenstudier (Vega), 17th December 1958, Hemlig, H1267:105, Armétygförvaltningen Arkiv, F I:25, RA.
[342] FOA, Anvisningarna för studiegrupp vid VEGA, 7th August 1957, H320:2, FOA Archives, E 3a:20, RA

weapons. After debates, the parliament opted for the second rejecting nuclear weapons acquisition.[343] It was not exactly the end of it. The vote functionally did little more than postpone the decision. In 1958, the Defense Minister explicitly suggested Nils Swedlund clandestinely continue research, in spite of the parliament's opposition. Swedlund, though a proponent of nuclear weapons, and probably not a man morally opposed to clandestinity, refused. Indeed, how would such clandestine agreement be cleared by the parliament? How could it work over the long term?[344] Swedlund was confronted with the inevitability of revelation. In 1958, the Swedish program was only a few steps away from completion. Sweden arrived at a point where studies should go from theory to practice,[345] which meant many decisions had to be taken that year to establish reactor designs, the availability of heavy water, the enrichment facilities, etc.[346] Studies had also been conducted on building of dedicated infrastructure, both for the production and testing of nuclear weapons.[347] Test sites could have been built in secret – after all, it is what France and the UK did. Weapons production, however, was trickier. In the late 50s, a major shift happened in Swedish nuclear policy, with the choice of light-water reactor design, and the decision to buy enriched uranium from the US. From then on, Swedish officials could no longer use their civilian program as a bridge toward nuclear weapons. This left a separate military program with its own infrastructure as the only way toward nuclear weapons.[348] It was in no way impossible. However, the resources necessary for such a program would have to come from parliament. This explains Swedlund's refusal and eventual resignation in front of the Government's indecision.

This is an example of the curious situation of nuclear secrecy in Sweden. At the action policy level, Parliament could exert control because it had become almost impossible to build a clandestine program.

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[343] Jonter, *The Key to Nuclear Restraint*, 87.
[344] Agrell, *Svenska Förintelsevapen*, 165.
[345] FOA had indeed, by 1957, solved many important theoretical issues. In 1955, Magnusson considered that the problem of the detonation system was theoretically solved, and required now practical analysis (Notes from a meeting, entitled "Atomåldern", 1955, Tage Erlander Archives, 4.2 :005, ARAB, 11). Moreover, aside from their own research, FOA researchers were gathering information about nuclear weapons designs based on the analysis of US and Soviet fallout debris (Rolf Sievert, Sammanfattning av uppgifter angående registreringar I Sverige av från explosion härrorande strålning, 4th April 1954, Hemlig, FOA Archives, Ö IV:4-5, RA.)
In 1957, FOA researchers started to consider the conditions in which atmospheric tests could be carried out.
[346] FOA, PM beträffande "beslutläget" i atomvapenfrågan, 3rd December 1957, Hemlig, H339:1, FOA Archives, Ö IV:7, RA.
[347] FOA, PM rörande lokalisering av försökstation, 21st January 1958, Hemlig, 85:8, FOA Archives, Ö IV:10-14, RA.
[348] Jonter, *The Key to Nuclear Restraint*, 123.

At the declaratory policy level, Parliament could also exert a certain control over policy, by deciding whether such a policy would be “We want the bomb” or “We do not want the bomb”. But, paradoxically, it could not exert control over internal events in FOA, where secrecy remained the norm. Ambiguity persisted over FOA’s research – what it actually did, and what it should be doing. The latter problem came from the difficulty of defining the limits of protection research. All political actors were aware of the highly ambiguous nature of “protection” and could not find a satisfying way of demarcating the line between the two.[349] It is likely that denial played a role here, and that MPs refused to break the silence. The adopted line, dubbed “freedom of action” was supposed to leave FOA with some freedom of interpretation over what protection meant, so that Sweden would not definitively deny itself the opportunity to develop to nuclear weapons.[350]

In this context, secrecy continued. The activities were transferred into a new section, FOA4, which continued to operate among the rest of FOA, but behind an “extra-layer” of secrecy.[351] Secrecy over nuclear-related activities had, in fact, been reinforced during the year 1958 due to an external factor: US cooperation. For some years, Sweden had been trying to obtain knowledges from the US. In 1956, while pretending to visit family members in Germany, General Swedlund had visited a nuclear test site.[352] During a trip to the Hughes Aircraft factory in the US, Swedish Army Engineers were also shown plane modifications necessary to carry tactical [353] For real cooperation to materialize, the United had exigencies. Colonel Stig Wennerström reported those exigencies to the political leadership: to reach an agreement with the US, Sweden would have to perfect its secrecy regulation, not matching American criterions.[354].

[349] Hoadley, *Atomvapnet som partiproblem*, 173, 183.
[350] Jonter, *The Key to Nuclear Restraint*, 196.
[351] *FOA och kärnvapen*, 44.
[352] Simon Moores, “Neutrals on Our Side: US-Swedish Military and Security Relations during the Eisenhower Administration” (Doctoral Dissertation, London, University of London, 2005), 107, fn. 235.
[353] Caroline Trulsson, “Jaktrobotar, Kärnvapen Och Personlig Vänskap – Kalla Krigets Militärtekniska Samarbete Med USA,” *Militärhistorisk Tidskrift*, no. 2014:1 (2014): 95.
[354] Thomas Jonter, “Det Amerikanska Spåret. En Undersökning Av IB:S Bildande Och Eventuella Kopplingar till USA - Forskarrapporter till Säkerhetstjänstkommissionen” (Stockholm: Statens Offentliga Utredningar, 2002), 158. How ironic, if we consider that Wenneström himself was a Soviet spy and had been for several years – he would be caught in 1963. See Anders Sundelin, *Fallet Wennerström* (Stockholm: Weyler förlag, 2013).

In 1958, Sweden received the State-Defense Military Information Committee (S-DMICC). The Committee's visit was the culmination of negotiations with the US regarding the sale of nuclear-capable material – namely, Bomarc and Falcon missiles (as well as the nuclear incapable Sidewinder 1A). This Committee was one of the instruments of US secrecy regulation abroad. Created by a Truman memorandum in 1946, the Committee's goal was to "exercise control of the disclosure of classified military information", most particularly by "making determinations as to the ability of foreign governments to afford security protection to classified military information (including classified atomic military information, when such determinations are requested by the Secretary of State) to be released to them by the United States".[355] In Sweden, its investigation "reached from basic security legislation, and governmental departmental security, physical and personnel security to security in industry and classified matter control."[356] Its report was "glowing" [357], emphasizing the excellent quality of Swedish security information. It concluded that the government was "acutely aware" of the dangers of espionage, that personnel and physical security procedure were "effectively applied", and that industry security – the S-DMICC had visited the SAAB factories, where the missiles would have been produced – was sufficient[358]. Reforms had, indeed, been implemented very recently and the cooperation between civilian and military security services had been improved. Secretly, in 1957, a special secret service called the Information Bureau had been created to provide the government with independent assessments of personnel security.[359] The Swedish state, for which such institutions were rather unusual, had upgraded its security practices with the US model in mind. All this, however, did not function the way US investigator thought it did, and it is likely that Swedish security services oversold their effectivity in the hopes of securing US cooperation [360]. In any case, after 1958, secrecy was on the rise inside the Swedish state, particularly when it came to technological developments somehow linked with nuclear weapons.

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[355] Memorandum for General Counsel, "State-Defense Military Information Control Committee (S-DMICC)", 27 June 1962, Secret, available online: https://archive.org/details/CIA-RDP80B01676R003100200011-6
[356] Nilsson, *Tools of Hegemony*, 324.
[357] Moores, "Neutrals on Our Side," 177.
[358] Moores, 187.
[359] It must be emphasized here that Thomas Jonter, in an in-depth investigation into the Swedish archives has established no direct link between the creation of this Bureau and American demands. Rather, its creation was a sign of the general direction the Swedish security regime. Jonter, "Det Amerikanska Spåret," 182–83.
[360] Jonter, 170.

Behind this "extra layer" of secrecy, some contemplated the possibility of continuing the nuclear program. According to a former FOA researcher, though research was under strict government oversight, the communication between the parliament and the government was "quite limited".[361] As a result, FOA enjoyed liberties to pursue research clandestinely. In a study from 1963, a FOA researcher literally proposed fully building an atomic bomb, though without any fissile material, since it would help understand how they worked and thus how to develop better protection systems.[362] Some continued to research the possibility of testing atomic weapons, this time underground, and others elaborated plans for nuclear weapons production.[363] It is as if these researchers were trying to put together all the pieces of the atomic puzzle, waiting for the political leadership to find a solution to fissile material production. Some kept thinking about using the existing facilities, notably the Ågesta reactor, to produce plutonium but recognized that it would be impossible without an official declaration – hence, a revelation – since the reactor was internationally known.[364] Similarly, in 1962, a report was produced by the Chief of Staff, under the name of *Kärnladdningsruppens betänkande* – literally, the report of the nuclear warhead group – which studied anew the possibility of a Swedish nuclear program. The report was produced without a government request, kept highly classified and circulated in a restricted manner inside the state.[365] It is highly unlikely that the parliament ever heard of it – though it eventually came to naught anyway. The military was aware of the extreme sensitivity of the issue and tried to ensure that no "unsuitable" information leaked to the press.[366] It even censored one of its Army manuals, which contained references to the use of atomic weapons in combat, retracting and destroying all the printed volumes before printing

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[361] Nils Gyldén, "Niels Bohr, de Svenska Kärnvapenplanerna Och Kopplingarna till Den Civila Kärnenergiutbyggnaden," in *Svenska Atomvapen. Utvecklingen Av Svenska Taktiska Kärnvapen Och Vapenbärare under Kalla Kriget*, ed. Kent Zetterberg (Stockholm: Svenskt Militärhistoriskt Bibliotek, 2016), 39.
[362] One could note that it is probably not by chance that "building an entire nuclear weapon without fissile material" is a proposition which could turn out handy for a country whose only problem is how to produce enough fissile material to produce a nuclear device. PM angaende behov av fortsatt arbete med skyddforskning betr. Kärnladdningars säkerhetsystem, 6th June 1963, Hemlig, FOA Archives, Ö IV: 23-21, RA, 22-23.
[363] "Om kostnader för kärnvapenprov i berg", 22nd March 1963, Hemlig; Tidsplan och medelsbehov för kärnvapentillverkning, 3rd December 1964, Hemlig, FOA Archives, Ö IV: 23-21, RA.
[364] PM beträffande tillverkning av kärnladdningar, 5th January 1962, Hemlig, FOA Archives, Ö IV:15-22, RA, 9.
[365] For example, Sverker Åström, head of the Foreign Affairs ministry's cabinet, was entrusted with the report, but only for a limited times (around three weeks). Sundelin, *Fallet Wennerström*, 436.
[366] Paul M. Cole, "Atomic Bombast: Nuclear Weapon Decisionmaking in Sweden 1945-1972," Occasional Paper (Washington: The Henry L. Stimson Center, 1996), 17.

new ones.[367] Similarly, the cover of FOA 4 allowed for the creation of a "section for special technics", which engaged in nuclear intelligence behind a false name.[368]

The persistence of secrecy over nuclear research offered autonomy to FOA and restricted the parliament's ability to fully control Sweden's nuclear policy. It could control the upper limit – as it was unlikely that nuclear acquisition could be possible without asking the parliament for funds – but not the gray zone in which FOA operated. Though Parliament was not excluded from policymaking, distortion and denial played a role in restricting the boundaries of democratically controllable policies. For a decade years, nuclear activities continued behind a veil of secrecy without parliamentary oversight,. This raises the question: when was control eventually asserted?

iii. After the bomb: secrecy's hysteresis

Slowly but surely, the Swedish nuclear program died out. By the mid-1960s, FOA researchers involved in nuclear issues started to seek employment elsewhere.[369] By 1963, some at ASEA, the Swedish civilian nuclear company, considered it a given that there would not be any Swedish nuclear weapons.[370] Military officers stopped pushing for nuclear weapons, and the Swedish government rallied to the cause of disarmament. It eventually signed the Nuclear Non-proliferation treaty in 1968, ratifying it two years later. In 1972, the plutonium laboratories at FOA closed.[371] But secrecy did not return to its previous state, and the slow death of the nuclear program only brought even more opacity into the issue. The topic ceased to appear in public debates for years. The research previously produced, however, continued to be classified. In the words of historian Wilhelm Agrell, "the work in FOA's plutonium laboratories was somehow more secret after 20 years than when it began in the early 1960s".[372]

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[367] Cole, 18. The censored pages can be read in Rickard Åkerman's archives, vol.5, RA.
[368] Yttrande över "Utredning angående den tekniska underrättelse-tjänsens uppbygnnad", 5th October 1963, H 4205-097, Hemlig, FOA Arkiv, F 1:48, RA.
[369] Fröman, "Kärnvapenforskning," 166.
[370] Annki Schagerholm, *För Het Att Hantera : Kärnkraftfrågan i Svensk Politik 1945-1980* (Göteborg: Historiska Institutionen i Göteborg, 1993), 45.
[371] Jonter, *The Key to Nuclear Restraint*, 250–52.
[372] Agrell, *Svenska Förintelsevapen*, 11.

Secrecy persisted until the 1990s, when many actors had passed or left power, sometimes after repeatedly asserting that they always had been against nuclear weapons.[373] In 1985 a very well-informed series of articles was published in the journal *Ny Teknik*. In these articles, journalist Christer Larsson documented the extent of the Swedish nuclear program and argued that military officers and FOA researchers had misled the public and the government by secretly continuing nuclear weapons research outside of their mandate.[374] Though the claims were highly exaggerated, the articles triggered an immediate reaction from the Swedish government, which commissioned an inquiry. The commission's report, published in 1987, concluded that nothing untoward had happened.[375] This was the first thorough public report on the question, although it was not fully transparent. In 1994, the international press, in the wake of the Gulf war and the discovery of the Iraq program, published articles on Sweden's supposed nuclear latency.[376] This triggered a denial by the Swedish Nuclear Power Inspectorate (SKI). In 1998, as Sweden signed the Additional Protocol to the Safeguard Agreement with the International Atomic Energy Agency, it was required to map out its nuclear activities. The Swedish Nuclear Power Inspectorate, at this occasion, commissioned historian Thomas Jonter for a survey of FOA's archives. This resulted in a large opening of the Swedish archives, which corrected some of the conclusion drawn by the 1987 report.[377] Finally, almost 30 years later, revelation came, and a correct picture of Sweden's nuclear policy could be formed. Accountability became technically possible, too. To a certain extent, this process of revelation continues to this day, a certain number of archives being still classified based on the Swedish obligation as per the Non-Proliferation Treaty, which prohibits "assistance" in the production of nuclear weapons.[378] It is not rare for a researcher to be given archival boxes with missing documents, carefully cut out from the binders, whose absence is justified in the name of non-proliferation. Nuclear secrecy casts a long shadow.

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373 Prime minister Olof Palme, for example, long claimed his opposition to nuclear weapons but he turned out to have been one of the last proponent of the nuclear option inside Erlander government. Jonter, *The Key to Nuclear Restraint*, 188–89.
374 Christer Larsson, "Historien om en svensk atombomb 1945-1972", *Ny Teknik*, 1985-1987.
375 Olof Forsberg, *Svensk Kärnvapenforskning 1945-1972* (Stockholm: Försvarsdepartementet, 1987).
376 Steve Coll, "Neutral Sweden Quietly Keeps Nuclear Option Open," *Washington Post*, November 25, 1994.
377 Jonter, "Sweden and the Bomb. The Swedish Plans to Acquire Nuclear Weapons, 1945-1972," i.
378 Offentlighets- och sekretesslag (2009:400), Part III, §12.

The Swedish case teaches different lessons. First, it shows that a more democratic form of legislative control in the nuclear domain *is* possible – if you want it. Had Sweden fully completed its nuclear program, the level of parliamentary involvement might, of course, have changed. Notably, secrecy surrounding targeting policies or stockpile capabilities would have become problematic. Second, the Swedish case also shows that the constraints of secrecy in the nuclear domain seem to pose some structural restrictions to legislative control. When the weapon program was abandoned, secrecy allowed FOA to continue research in the name of "protection research", behind the thick walls of secrecy which surrounded everything nuclear and military. Even when all research has stopped, secrecy persisted beyond the terms in office, and sometimes lives, of the key players.

4. Conclusion

This overview of the interaction between secrecy and legislative control leads us to a set of findings about nuclear secrecy and democratic governance. First of all, it has shown that the formation of secrecy practices creates regimes of different shapes and sizes, but always exceptional in some way, abiding by their own rules, practices, or institutions. For the domestic public, nuclear knowledges were *very* secret. This was the result of the extreme control over information in the nuclear field, where only specifically vetted personnel could access certain sites, or read certain documents. This chapter has attempted to look beyond the technical/political dichotomy of nuclear secrets, by seeing nuclear secrecy regimes as a continuum of rules, practices or institutions which define who gets to know what and spans both technical knowledges and political ones. Parliaments do not necessarily need technical data about how to build Pierrelatte's centrifuges to make political choices, for example. But they should know that such centrifuges are being built, how many of them, at what cost and for what purpose for all these elements are essential for the steering of force development policies. Therefore, from a democratic perspective, technical secrecy has many political implications.

The second finding relates to the dynamics of revelation in nuclear weapons programs. Essentially, it is assumed that one reveals their nuclear program to signal capabilities, or to manage the presence – or absence – of threats of preventive actions against their program. For example, Narang explains that certain states "seldom attempt to mask" their nuclear development because of the absence of preventive

threats against the program. Therefore, the international system constraints – or its lack thereof – should explain secrecy over the program.[379] Though I do not deny the importance of the US in defining the boundaries of secrecy, as argued in the previous chapter and this one, I have also shown that domestic considerations related to the weight of contradictions explain better why French and UK officials became open about their program – and why Swedish officials realized clandestinity was not an option.

The third finding is related to democratic control. It is clear that nuclear secrecy has a strong impact on legislative control. This effect works through different mechanisms, from outright exclusion to the more informal denial observed during the clandestine period, passing by distortion mechanisms which restrict parliamentary knowledge of proposed, ongoing, and past policies. It also varies over time and states and differs according to levels of policy. I summarize the findings in the following table.

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[379] Narang, *Seeking the Bomb*, 21–22, 159.

<table>
<tr><th rowspan="2"></th><th colspan="2">UK</th><th colspan="2">France</th><th colspan="2">Sweden</th></tr>
<tr><th>Clandestine period</th><th>Legal period</th><th>Clandestine period</th><th>Legal period</th><th>Clandestine period</th><th>Legal period</th></tr>
<tr><td>Action policy</td><td rowspan="3">Absence of democratic control. Exclusion, concealment of policy, and organized denial.</td><td>Absence of democratic control. No deliberation over choices, absence of oversight, lack of accountability for policy choices.</td><td rowspan="3">Absence of democratic control. Exclusion, concealment of policy, and organized denial.</td><td>Absence of democratic control. No deliberation over choices, absence of oversight, lack of accountability for policy choices.</td><td rowspan="3">Absence of democratic control. Exclusion, concealment of policy, and organized denial.</td><td>Effective control over action policy via deliberation over policy choices</td></tr>
<tr><td>Force development policy</td><td>Restricted democratic control. Deliberation possible, but absence of consultation over development choices. Distorted information results in flawed oversight and accountability</td><td>Restricted democratic control. Deliberation possible, but absence of consultation over development choices. Distorted information results in flawed oversight and accountability</td><td>Restricted democratic control. Deliberation possible, but absence of oversight over FOA’s work. Accountability possible only after 30 years</td></tr>
<tr><td>Declaratory policy</td><td>Ineffective control due to ignorance of action policy</td><td>Ineffective control due to ignorance of action policy</td><td>Effective control via deliberation over policy choices</td></tr>
</table>

Table 3 - Nuclear policy and democratic control. Summary of the findings

As one can see, control is almost absent for action policies, restricted for force development and possible for declaratory policy under certain conditions – that is, if the parliament is aware of the existence of a nuclear policy. But what is the value of control over a level of policy which cannot be assessed independently from the two others? The only level on which parliaments could have made choices was also the one with the least actual impact over nuclear policy. In the UK, Parliament agreed with the declaratory policy of deterrence by MAD, but real action policy was oriented toward damage limitation and counterforce strikes. In France, Parliament assented to the posture of deterrence through bomber forces, but did not know that such a policy was, in fact, inconsistent with the actual means of the arsenal and that action policy revolved around a catalytic posture – at least until 1974.

This implies that the creation of nuclear secrecy regimes, which stemmed from the nuclearization of the state did, in fact, impact democratic governance by creating a "black spot" in the fabric of the state, which the parliament could not meaningfully control. Even in Sweden, where parliament closed the door on nuclear acquisition, the black spot of nuclear research inside FOA allowed force development policy to continue without parliamentary control. This is, certainly, one of the strongest implications of nuclearization for democratic state. Because the security implications of nuclear weapons require state actors to erect high walls around most things nuclear, they also create opportunities for those actors to easily escape the parliament's gaze – and if the parliament is not controlling nuclear policy, then who is? In that sense, nuclearization makes democracies vulnerable. It creates weak spots in state structures which can lead to undemocratic practices. But even if those actors had not sought to circumvent legislative control, structural secrecy would have remained an issue. Many of the secrecy measures described in this chapter stemmed from security concerns related to the Cold War and security more generally. Even without attempts to obfuscate nuclear policy, legislative control would have remained limited. In that sense, nuclear secrecy regimes restricted the extent of democratically decidable policy choices.

Chapter 5. Hiding the clouds.

Secrecy, nuclear testing, and control over state harm.

During the Cold War, the United Kingdom, and then France, engaged in atmospheric nuclear testing.[1] It served several purposes: to "speed up the process (…) to develop and deploy their nuclear weapons, [it] allowed weapons to be smaller and lighter, and perhaps gave added confidence in these weapons performing as intended and greater insight into nuclear-weapon effects."[2] These tests produced externalities, in the form of radioactive fallout and thus put people in harm's way.[3]

This chapter is interested in the question of democratic control over the production of those externalities. The previous chapter was focused on policy choices. In this one, I focus on some of their unintended, yet predictable, consequences. The ability of the public to exert some level of control over the risks created, or the harm caused, by state actions is essential as the condition of the democratic public is one of "*vulnerability to delegated power*", as the public remains vulnerable to "the possibilities for harms" done by the state.[4] Because state actions are many and complex, they can have multiple negative externalities which violate the social contract established by a people and its state.

Because state actions can be harmful, the public must be able to ensure the agent to which they delegated power respects their preferences. Only then can the state qualify as democratic. People may consent to being exposed to risks or even harm, but consent can only be valid if it is informed. There is nothing inherently undemocratic in exposing certain populations to risks, like those resulting from nuclear

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[1] The United Kindgom carried out 21 atmospheric tests, and France 50.
[2] Zia Mian, "A Step toward What? Nuclear Weapons, the Test Ban, and a World without Nuclear Testing," *The Nonproliferation Review* 23, no. 3–4 (July 3, 2016): 305.
[3] When a nuclear warhead explodes in the atmosphere, several fission products are created, many of them highly radioactive. The heat of the blast destroys the elements around it: the material of which the device is composed, of the object – tower, balloon, barge… - on which the device stood before its detonation and, depending on the height of the test, as well as the environment in which it is detonated, of the ground beneath it (sand, coral, water…). These elements are transformed into a plasma and blown into the atmosphere by the force of the blast. In this plasma, fission products – as well as other radioactive elements such as un-fissionned remnants of plutonium – attach to other materials. With time, these elements fall back on earth, still radioactive, and can harm both humans and their environment. Not all of them, however: some fission products have a very short half-life. See Samuel Glasstone and Phillipe J. Dolan, *The Effects of Nuclear Weapons* (Washington D.C: United States Department of Defense & Energy Research and Development Administration, 1977), chap. 9.
[4] Mark E. Warren, "Accountability and Democracy," in *The Oxford Handbook of Public Accountability*, ed. Mark Bovens, Robert E. Goodin, and Thomas Schillemans (Oxford: Oxford University Press, 2014), 41–42. (emphasis in the original).

testing. But it needs to come about through deliberation in which the public can give consent, is informed about risks, exert oversight over the conduct of those tests, and demand accountability in case harm was inflicted. If the public is prevented from acquiring knowledge of certain aspects of planned operations which create risks, then control cannot be effective. Secrecy, as discussed in the previous chapter, can be an obstacle to control. Hence the question of this chapter: How did secrecy regimes affect the ability democratic control over the harmful activities of the nuclear state?

This chapter focuses on atmospheric nuclear testing as it is the clearest example of risky and harmful activities related to states' nuclear policy. It is certainly not the only one.[5] But it is specific to the *nuclear-armed* state as all nuclear tests have been conducted by nuclear-armed states, even if not all nuclear-armed states have tested nuclear weapons.[6] For this reason, also, Sweden will be left out of the analysis. Sweden's nuclearization simply did not go so far as to lead the state to engage in potentially harmful activities of this kind.[7] The chapter thus looks at the construction of the nuclear secrecy regime around British and French atmospheric test sites and argues that these regimes were organized in ways that made democratic control impossible over the immediate term, and difficult over the long term. The British case is a little different to the French one, considering that the affected public were not always

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[5] Fissile material production or storage of nuclear warheads, for example, also present risks. In Britain, it is clear that state officials attempted to use secrecy to tame public criticisms after the Windscale incident. Similarly, incidents involving nuclear weapons in the UK have emerged over the years, despite efforts to conceal them. Though no comparable incident appears on the historical record in France, one should not assume that this was the result of perfect control, and not of luck, or even of tampered evidence (a much larger portion of nuclear archives being still withheld from the French public than from the British one). On Windscale, see Lorna Arnold, *Windscale 1957: Anatomy of a Nuclear Accident.* (London: Palgrave Macmillan Limited, 1995). On reports of accidents involving nuclear weapons in Britain, see Eric Schlosser, *Command and Control: Nuclear Weapons, the Damascus Accident, and the Illusion of Safety* (New York: The Penguin Press, 2013), 262; Gregory Shaun and Alistair Edwards, "The Hidden Cost of Deterrence: Nuclear Weapons Accidents 1950-88," *Bulletin of Peace Proposals* 20, no. 1 (March 1989): 3–26.

[6] Israel and/or South Africa most likely carried a (possibly joint) test in 1979, but this has not been officially confirmed. See Avner Cohen, William Burr, and Richard Wolfson, "The Vela Flash: Forty Years Ago," *National Security Archive* (blog), September 22, 2019, https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2019-09-22/vela-flash-forty-years-ago; Avner Cohen and William Burr, "Revisiting the 1979 VELA Mystery: A Report on a Critical Oral History Conference," *Wilson Center* (blog), August 31, 2020, https://www.wilsoncenter.org/blog-post/revisiting-1979-vela-mystery-report-critical-oral-history-conference.

[7] Interestingly enough, it does not mean that Swedish official were not embroiled in controversies over the harmful effects of nuclear tests and did not try to frame them as being perfectly controlled and harmless activities. To the contrary, when the Swedish public was debating possible nuclear acquisition, an argument put forth by anti-nuclear activists was that nuclear acquisition would require testing and, hence, fallout – something the military tried to counter by arguing that nuclear tests could be carried out safely. See the papers in Carl Erik Almgren's archives, notably the note entitled "Är det möjligt att utan risk utföra erforderliga prov med i Sverige eventuellt tillverkade atomladdninggar?", 13th November 1957, Carl Erik Almgrens Arkiv, Deposition 3 (03:2), RA.

British citizens, but Australian ones. Nevertheless, the British state had obligations toward the citizens of an allied country, a member of the Commonwealth even. Moreover, the British public had a right to demand information about its state's actions abroad, especially where they might cause harm, since it engages the state's responsibility. Therefore, it is only logical to expect nuclear testing activities to be submitted to democratic control. Based on the table used in chapter 1, I find control over nuclear testing to be effective under the following conditions:

Modes of control	**Conditions for effective democratic control**
Deliberation	Ability to deliberate and obtain accurate information about the possible future risks implied by proposed policies.
Oversight	Ability to exert external oversight and obtain accurate and independent information about ongoing policies and the realization of risks.
Accountability	Ability to obtain *a posteriori* accurate information about the realization of risky activities to establish the potential commission of harm.

Table 4 - Conditions for democratic control over harmful state actions.

I have shown, in the previous chapter, that no consent was asked for, nor given, for the creation of nuclear test sites, which happened without deliberation. Now, I argue that because nuclear secrecy around test sites was organized so as to exclude the public wherever possible, oversight and accountability were also made impossible, or flawed.

For oversight and accountability to be effective, and not purely nominal, two conditions must be met. First, there must be some independence, as the effectiveness of oversight depends on where the overseer sits. Claudia Hillebrand notes that "non-executive forums are of particular importance from a perspective of democratic security governance to ensure that an 'outside' check of executive actions takes place".[8] Effective democratic oversight requires that no actor with a vested interest – and particularly the executive – controls itself. Second, oversight requires proper access to information. Overseers must be provided with an adequate level of information to control state activities. If actors

[8] Claudia Hillebrand, "Intelligence Oversight and Accountability," in *The Routledge Companion to Intelligence Studies*, ed. Robert Dover, Michael S. Goodman, and Claudia Hillebrand (London: Routledge, 2013), 307.

are denied access to crucial information or must rely on the executive goodwill to obtain it, then oversight is unlikely to be effective.[9] The same goes for accountability. As Richard Mulgan writes: “only if the people receiving the information have the right to demand it and to seek remedies, is the relationship one of accountability”.[10]

Though oversight mechanisms did exist, the use of secrecy and the presence of actors with vested interests rendered them ineffective as forms of public control. Secrecy withheld data for a long period of time, which, along with specific ways in which data collection was organized, allowed actors to escape accountability for the harm caused by the nuclear arsenal’s development. I argue in conclusion that this absence resulted in an invisibilization of nuclear harm which was not only a consequence of nuclearization, but a precondition. Had state officials publicly recognized the harms done by nuclear testing, the development of their nuclear arsenals would likely have taken a different path.

To make my case, I rely on a useful distinction made by Irving Goffman between “strategic” and “dark” secrets and show how the entire design of test site secrecy regimes, which was set up to protect strategic secrets, made the concealment of dark secret possible. Strategic secrets refer to “intentions and capacities” which an actor “conceals from its audience in order to prevent them from adapting effectively to the state of affairs the team is planning to bring about”.[11] Essentially, in the case of test sites, strategic secrets are weapon-related data. On the other hand, dark secrets refer to “facts (…) which are incompatible with the image of self that the team attempts to maintain before its audience”.[12] That is, fallout contamination. The argument is that secrecy around test sites was organized primarily control “strategic secrets”, a Herculean task considering that those would be spread by the wind – fallout sampling, indeed, can reveal a lot about a state’s technological development. While officials never managed to keep those secrets, the information control regime allowed them to exert effective control over the state’s dark secrets by offering a wide array of rules and practices of information control around

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[9] Deirdre Curtin, “Overseeing Secrets in the EU: A Democratic Perspective,” *JCMS: Journal of Common Market Studies* 52, no. 3 (May 2014): 688–89.
[10] Mulgan, *Holding Power to Account*, 11.
[11] Erving Goffman, *The Presentation of Self in Everyday Life* (New York: Doubleday, 1959), 142.
[12] Goffman, 141–42.

test sites. Test sites became closed spaces, and their installment was accompanied by a whole series of security institutions and practices aimed at preventing espionage. Barriers were built, surveillance was enhanced, and the audience of each test was carefully selected. As a result, only a handful of actors could know what was happening around any given area, generally select state officials and, ironically, foreign intelligence services. Officials could effectively escape democratic control through mechanisms of exclusion and distortion: the extent of radioactive fallout was consistently dismissed, accidents were concealed, oversight mechanisms were flawed by the presence of "shills" – actors acting as independent controllers who, in fact, had vested interests in maintaining secrecy[13] – and accountability over the long-term was made difficult. This chapter is therefore organized into two sections. In the first, I show how the secrecy regime was originally organized around strategic secrets. In the second, I show how it ended up being used to escape democratic control, showing clear similarities between British and French practices.

I make a contribution to the literature on nuclear secrecy regimes, first, as none of the studies focusing on that topic explore the question of fallout in depth.[14] This is not the case for the literature on nuclear testing, which has long insisted on secrecy, and on how actors used secrecy to escape accountability for harm.[15] This literature, however, has insufficiently explored the links between strategic and dark secrets, focusing on the latter only. Moreover, it has focused on secrecy as concealment, overlooking how information control regime can affect democratic control in many different ways. In this chapter, I show that the two kinds of secrets cannot be separated and that the absence of democratic control over fallout

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[13] Goffman defines a shill as "someone who acts as though he were an ordinary member of the audience but is in fact in league with the performers". It is, simply put, someone who pretends to be on the public's side but who defends the interests of state officials. Ernest Titterton and Louis Bugnard, discussed in the second section (2.b), are examples of these figures. Goffman, 146.

[14] Salisbury, *Secrecy, Public Relations and the British Nuclear Debate*; Wellerstein, *Restricted Data*.

[15] For a general synthesis, see Robert A. Jacobs, *Nuclear Bodies: The Global Hibakusha* (New Haven: Yale University Press, 2022), chap. 4. On French testing and secrecy, see Bruno Barrillot, *Les irradiés de la république. Les victimes des essais nucléaires français prennent la parole* (Paris: Grip, 2003); Sébastien Philippe and Tomas Statius, *Toxique. Enquête Sur Les Essais Nucléaires Français En Polynésie* (Paris: PUF ; Disclose, 2021); Renaud Meltz, "Sous Le Signe Du Secret. Les Campagnes d'essais Aériens.," in *Des Bombes En Polynésie. Les Essais Nucléaires Français Dans Le Pacifique*, ed. Renaud Meltz and Alexis Vrignon (Paris: Vendémiaire, 2022), 185–270; Sébastien Philippe, Sonya Schoenberger, and Nabil Ahmed, "Radiation Exposures and Compensation of Victims of French Atmospheric Nuclear Tests in Polynesia," *Science & Global Security* 30, no. 2 (May 4, 2022): 62–94. On British testing and secrecy, see Tynan, *The Secret of Emu Field*; Tynan, *Atomic Thunder*; Roger T. Cross, *Fallout: Hedley Marston and the British Bomb Tests in Australia* (Kent Town: Wakefield Press, 2001).

stemmed from the general organization of secrecy around test sites, and not simply from instrumental uses of concealment stratagems. This highlights the structural nature of nuclear secrecy's effects on democratic control. For this reason, I engage into an in-depth analysis of information control policies surrounding nuclear test sites and propose a new look into a well-studied topic. For this, I have relied on many primary sources, some untapped and hitherto unpublished in English.

For the study of the British case, I have used primary sources from the Ministry of Aviation, secondary sources, as well as the lengthy two volumes report from the Royal Commission into British Nuclear Tests, a commission established in the 1980s to establish the record of UK-AUS relations in regard to nuclear testing. The reports were established based on privileged access to British sources and many auditions of key actors, the latter being available online.[16] Though incomplete, and worthy of criticism, this source is nevertheless considered reliable.[17] For lack of such sources, I have used a different methods for the French case. The recent declassification of a large number of CEA and Ministry of Armies archives allowed to access previously untapped archives. I have also relied on more original archives, notably from the Ministry of Health, the *Service Central de Protection contre les Radiations Ionisantes* (SCPRI, Central Service for Protection against ionizing radiation), the Ministry of Public Transportation, as well as private archives from the Observatoire des Armements and Jean Charbonnel's paper who served in the Ministry of Health cabinet in the 1960s.

1. Keeping strategic secrets: excluding the unwanted audience

Nuclear test sites were shrouded in secrecy because they are places designed to keep secrets. On nuclear test sites, nuclear explosive devices or actual nuclear weapons were deployed in experimental settings and revealed a wealth of information about the state of the French or British nuclear arsenals: their design, their yield, their flaws, their delivery vehicles… These technical data are what Goffman called "strategic secrets", which "pertain to intentions and capacities of a team which it conceals from its

[16] National Archives of Australia, Serie A6448, "Royal Commission into British Nuclear Tests in Australia During the 1950s and 1960s - Transcripts of proceedings", available at : https://recordsearch.naa.gov.au/SearchNRetrieve/Interface/ListingReports/ItemsListing.aspx?series=A6448
[17] On the politics behind the Royal Commission, and the aspects it left aside, see Jessica Urwin, "'The Old Colonial Power Can Stand Proxy': The Royal Commission into British Nuclear Tests in Australia and the Politics of the 1980s," *Australian Journal of Politics & History* 68, no. 4 (December 2022): 525–43.

audience in order to prevent them from adapting effectively to the state of affairs the team is planning to bring about”. [18] Controlling these strategic secrets constituted the primary purpose of secrecy around test sites. The goal was to maintain ambiguity about the state and trajectory of one’s nuclear capabilities in a context of security competition.

But atmospheric nuclear tests are bound to have an audience, since they take place out in the open. How can strategic secrets be kept secret in this environment? British and French officials used very similar techniques, designed not to fully conceal the sites – which would have been impossible - but to control the audience. They did so, first, by making test sites secret spaces, which those who lack the necessary clearance are forbidden to access. Second, they developed strong security regimes in and around those sites, showing how nuclear sites come with their own security apparatus to prevent spies and leaks. This time, people, not places, were the focus of secrecy measures. Finally, as they could not prevent people from knowing that tests would eventually take place, officials chose to hide what they could: the exact moment tests would happen. This allowed them to make sure that only a limited – and selected – audience could attend the “performance” of the test.

a. Weapon data: the contours of strategic secrecy

Before looking into the information control regime, I must first outline its content. What did strategic secrecy entail? The kind of weapon data that was to be kept secret fell into two categories: information which would reveal too much about the bomb designs, and that which would reveal too much about devices’ actual capabilities, that is, their yield.

A note from the French “Dircen” issued to its personnel in 1970 bears testimony to this hierarchy in secrecy on nuclear test sites. Civilian and military personnel were instructed on what they could and what could not say. Some information, such as the technique used for the shot, or the results of fallout measurements were only for “Restricted diffusion”. Others, related to the campaign’s general organization and the location of the “sensitive installation” were “Confidential”. Finally, the “form, dimension, preparation time, execution, storing and transport” of the tested device belonged to the last

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[18] Goffman, *The Presentation of Self in Everyday Life*, 142.

category, whose revelation could "lead to grave criminal sanctions". This category also encompassed the measurements made after the shot, particularly the "yield of the shot", and the "damages caused by the explosion", as well as the kind of material exposed.[19] A similar policy applied at British nuclear test sites, as is clear from the instructions given to personnel attending the trials: "details of the weapon itself or parts of it or its direct effects (other than general impressions of wind, noise, dust, cloud, etc.) must not be described". It established a list of "subjects which must not be mentioned", including "anything relating to the weapons, e.g., dimensions, weight, yield, how it was transported and lifted, where and how it was stored, etc.", as well as details such as the size of the fireball or the height of the cloud.[20]

Information that could reveal anything about the tested device design was the crown jewel of nuclear testing. This points to the fact that the primary target of exclusion was not the domestic public, but other states. The main goal of secrecy was to prevent external actors from acquiring knowledges about nuclear arsenals. Any atmospheric explosion risked exposing them. French and British officials were aware of the possibility of nuclear espionage. The British practiced it themselves, both with the Soviet adversary, and with the US ally, whose nuclear tests were closely monitored.[21] Although France seemingly did not practice the analysis of foreign nuclear debris[22], it was fully aware of that possibility. A 1966 report by the CEA notes that "the analysis of the radioactive cloud will allow foreign powers to assert that the mastering of thermonuclear phenomenon has not been reached" if they decide to analyze French clouds.[23] But because some data could eventually be known to external actors did not mean nothing could be hidden: the specific design of the weapon, the weight of fissile material used, or the explosion

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[19] Note de Service "Protection du Secret des Expérimentations nucléaires", 24th April 1970, n°11/70/CDT, Confidentiel, CEA/DAM.
[20] Minute "Mosaic Joint trial Order Number One. Security – Briefing and De-Briefing", 2nd February 1956, n°1000Z, Restricted-Guard, AVIA 65/817, TNA.
[21] On UK intelligence about Soviet nuclear testing, see Michael S. Goodman, *Spying on the Nuclear Bear: Anglo-American Intelligence and the Soviet Bomb* (Stanford: Stanford University Press, 2007), chap. 4. On US nuclear testing, see the *Report on Operation Bagpipes*, a British intelligence operation which took place during the Castle series in 1954 and gathered information "in spite of American efforts to secure it", in AVIA 65/786, TNA.
[22] At least, according to the testimony of a former CEA official Pierre Billaud and Venance Journé, "The Real Story Behind the Making of the French Hydrogen Bomb: Chaotic, Unsupported, But Successful," *The Nonproliferation Review* 15, no. 2 (July 2008): 358.
[23] CEA/DAM, Rapport sur l'intérêt d'une campagne de tir au CEP en 1967, 3rd October 1966, n°26K409, Secret Atome (A), S7315909;BCA-2016-108-3-(6)/BCA-Mi-1-S-13-(40), CEA/DAM.

effects at ground zero – particularly on specific military and protection materials – could still be concealed from outsiders. All possible measures were taken to ensure they were.

More so than the internal characteristics of the bomb, one specific piece of data which could reveal a lot about the state of one's technological capabilities was the focus of much attention: the yield, volume of energy released by the device's explosion. Although it was not always kept secret, officials wanted to make sure that they were the only ones in a position to release it. It appeared prominently in instructions given to military personnel. A satisfying yield was a matter of pride: after the first French nuclear tests, engineers and officials congratulated themselves on having reach a yield superior to the Hiroshima bomb's on their first try.[24] Yet, immediately after the test, even French diplomats were not made aware of it, as the military preferred "to keep that secret for now".[25] More commonly, however, concealing the yield was a matter of saving face. For example, the small yield of *Gerboise Blanche*, France's second nuclear test, was never officially released.

This secrecy on yield between different groups inside the same organization is not unique to the French. During the British *Totem* series, the group closest to the blast were instructed to write their report as such:

> "Reports should not reveal information from which the powers of the explosions could be deduced unless it is part of the group responsibility to obtain such information. In general this objective can be achieved if one parameter only is quoted (e.g. heat radiation but not heat radiation and distance, blast pressure but not pressure and duration or pressure and distance)"[26]

In doing so, testing officials were certain that only the selected audience would have access to the actual figures of yields. It was similar for *Mosaic*, where "for those who witness the tests, mention may be made, in general terms, of what is seen, but no details of distance involved are to be given as they may convey valuable information". Details of distance, indeed, would likely reveal much about yields. [27]

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[24] "Puissance de la bombe française : quatre fois celle d'Hiroshima", *Le Figaro*, 17 mars 1960.
[25] Austin R. Cooper, "Saharan Fallout: French Explosions in Algeria and the Politics of Nuclear Risk during African Decolonization (1960-1966)" (Doctoral Dissertation, Philadelphia, University of Pennsylvania, 2022), 197.
[26] Cited in Tynan, *The Secret of Emu Field*, 35.
[27] Minute "Mosaic Joint trial Order Number One. Security – Briefing and De-Briefing", 2nd February 1956, n°1000Z, Restricted-Guard, AVIA 65/817, TNA.

The prestige attached to the yield is more obvious when it comes to *thermo*nuclear testing. Both France and the UK struggled to achieve the thermonuclear status and sought to hide such technical difficulties. When testing the first British H-bomb, in 1957, Macmillan was frustrated by the low yield obtained by their fusion device and instructed "that the disappointing yields obtained in the Grapple series to date should have the highest possible security classification to prevent dissemination much beyond AWRE itself."[28] The UK had a H-bomb design, but it was not one of megaton-range and, in the words of Norman Brooks, "that was, at least in part, the reason why special secrecy was attached to [yield figures] at the time."[29] In that specific case, the yield was a double-secret: not only its disappointing character had to be hidden, but also the fact that the actual yield of 300kt fell short of the announced 500kt due to a calculation error. Once this became clear, "there was no question of going back in public", in the words of the UK Minister of Supply.[30] Although France did not resort to such stratagems, it reportedly prepared a boosted fission device to display a big shot in case its first H-bomb test failed in 1968.[31] A gendered perspective on this linkage between yield size, and therefore one's ability to exert violence, and prestige can give valuable insights into this phenomenon. It should not, however, obfuscate strategic considerations involved in the concealment of yields. In the UK case, reaching H-bomb capability was of diplomatic importance both in regard to the renascent relation with the US, and the ongoing debates over a possible test moratorium.[32] More generally, disappointing yields reveal much about a state's nuclear capabilities, and can inform adversaries. The symbolic nature of nuclear testing, once again, should not distract from the fact that nuclear testing was considered, at the time, an essential step in weapons development.

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[28] Jones, *The Official History of the UK Strategic Nuclear Deterrent, Vol.1*, 99.
[29] Cited in Jones, 99.
[30] Cited in Geoffrey Chapman, "A Very British Nuclear Conspiracy," *UK Project on Nuclear Issues* (blog), January 9, 2019, https://ukponi.rusi.org/a-very-british-nuclear-conspiracy/.
[31] General Guy Lewin, "Les activités opérationnelles et le soutien logistique du Centre d'Expérimentations du Pacifique", in *Les Expérimentations Nucléaires Françaises. Table Ronde Du 12 Juin 1992* (Paris: Groupe d'Etudes Français d'Histoire de l'Armement Nucléaire, 1992), 82.
[32] Indeed, the disappointing yield of *Grapple* "would have made it very clear to negotiators on the test ban that further testing was a necessity." Arnold and Smith, *Britain, Australia and the Bomb*, 183.

Now that I have established what constituted the basic boundaries of strategic secrecy, comes the question of the organization of control over strategic secrets. That is, how was the regime of secrecy – whose primary goal was to conceal strategic secrets – established in and around test sites?

b. Excluding the public: the making of secret sites

To limit the spread of strategic secrets around test sites, the first strategy used by officials was, simply, to close those sites to the external public. Secrecy began with geography. The British test sites in Australia, as well as France's site in Algeria, give a good idea of how those regimes were organized, and how they managed to exclude audiences.

Once they had announced to the public that they were going to test nuclear weapons on the island of Monte-Bello, British and Australian officials moved to hide the site from view. They resorted to a classic method: they made it into a forbidden zone. It was the purpose of the *Defence (Special Undertakings) Bill 1952*, presented in front of the Australian Parliament in June of that year. Its goal was unambiguously to maintain secrecy since it stated that "the reason for prohibiting this area is, of course, to protect from observation by any unauthorized person, whether they be on land, on sea or in the air, the activities being conducted in relation to the atomic weapon test." It was only "incidentally" that it would close the area for safety purposes.[33] Secrecy was not total: commercial ships were allowed to pass through the area under permit, as were the occasional planes. Unauthorized people in the area would however be searched and possibly arrested if they were considered suspicious. It was of "major importance" to maintain "the essential secrecy of the test, and the fact that nobody should be in the vicinity without a legitimate reason" and prevent "nefarious" curiosity.[34] The bill passed without much debate as it was obvious for Australian representatives that "secrecy in this context mean[t] secrecy from

[33] Declaration by the Minister for Defence in front of the Australian House of Commons, 4th June 1952, Official Hansard n°23, 1952, 1375.
[34] *Ibid.* 1376.

Russia".[35] The terms of warning implementing the Bill's provisions in regards to the *Hurricane* test were published on the 8th of August 1952.[36]

The *Defence (Special Undertakings) Bill 1952* was not "special" only in title: it, indeed, put a part of Australia's territory under a state of exception. This was made evident when British nuclear testing moved to Emu Field, a place on the border of the Woomera range. The Woomera range had been a prohibited area since its creation. Entering the zone without authorization was *already* forbidden, and anyone present without authorization could be fined or face 3-month in prison. However, as argued the assistant crown solicitor, LG Egan, "under the Defence (Special Undertakings) Act it is an offence, not only to be in or to enter the Prohibited Area without a permit, but it is also an offence to fly over the Area unless a permit has been issued (…) to make a photograph, sketch, plan, model, article, note or other document (…) or to be in possession of a camera without authority" inside the area.[37] The sentence, in this case, would be up to 7 years. It was one of several exceptional security measures strongly encouraged – although not imposed – by the British government. This special legal status was later given to the Maralinga site. It would be revoked in 1968.[38]

The situation was different for France. Although Reggane was considered a military terrain, no piece of legislation specified its exceptional nuclear status. Nevertheless, French sites in the Sahara certainly were under a similar state of exception. In the summer of 1959, Jacques Soustelle, in charge of "Algerian Affairs" for the Prime Minister, noted that the site was in quite a vulnerable position: "subject to an adverse atomic action, the protection of the Reggane's installation against a threat coming from all directions, and in particular from the East, can only be ensured within a general plan for the Defense of

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[35] Declaration by Representative Wentworth in the Australian House of Commons, 5th June 1952, Official Hansard, n°23, 1952, 161.
[36] These were so harsh, in fact, that some UK officials feared an international dispute: the zone defined by the Australian government seemed to extend into international water. Arnold and Smith, *Britain, Australia and the Bomb*, 38.
[37] Cited in Tynan, *The Secret of Emu Field*, 47.
[38] Maralinga Rehabiliation Technical Advisory Committee, "Rehabilitation of Former Nuclear Test Sites at Emu and Maralinga (Australia) 2003" (Canberra: Dept. of Education, Science and Training, 2003), 15.

the Sahara".[39] Experts in the military had a solution: diverting air corridors away from the site.[40] Creating a no-fly zone over the site, and diverting air corridors from the site, could not only prevent "the dropping [of soldiers or spies] at a short distance, but especially the taking of aerial photographs".[41] Protecting the site from "indiscreet observers" was particularly high on the list of French officials' priorities – higher, certainly, that the aforementioned risk of enemy airdrop, a concern which disappears from subsequent discussions. To address this concern, French officials created a no-fly zone. Two zones would be regulated. First, a small one, covering only the sensitive infrastructures, would *always* be forbidden. Such measures were considered "extremely harsh" by the Minister of Transportation, but Prime Minister Michel Debré would not budge, considering it "indispensable to forbid every foreign plane to fly over the Reggane installations".[42] Second, a much larger zone would be forbidden only around the time tests were taking place. Symbol of the exceptional nature of these measures, it was the ministry of armies – and not the civil aviation authorities – who got to determine the limits of the forbidden zone even though it was "not the ministry's role", as an apparently exasperated civil servant from the Civil aviation noted in passing.[43]

On the ground, the area around the Reggane site was hardly a hospitable place. The terms of the Decree which established the forbidden zone were certainly more extreme than the Australian Defence bill. Inside of it "each human being must be captured or killed", and planes and ground troops were allowed to "open fire without warning".[44] Such extreme measures should not be surprising: since April 1957, the Sahara region was under military rule. After 1962, as both Reggane and In Ekker were in activity, entries

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[39] Letter from Jacques Soustelle to the Premier Ministre, "Sécurité des installations du CSEM de Reggane", 25th June 1959, n°1891/CAB/MIL, Secret, 19760078/72, AN.
[40] Letter from Colonel Guittoneau to the Commandant Interarmées au Sahara, «Défense aérienne de Reggane », 20th May 1959, n°0016/CFAS/3/S, Secret, AI I 371, SHD.
[41] Letter from Jacques Soustelle, "Sécurité des installations du CSEM de Reggane", *op. cit.*
[42] Letter from the Ministre des Travaux Publics et des Transports to the Premier Ministre, "Sécurité du Centre Saharien d'Expérimentations Militaires de Reggan", 27th August 1959, n°51/S/DNA/1, Secret; Letter from the Premier Ministre to the Ministre des Travaux Publics, "Sécurité du Centre Saharien d'Expérimentations Militaires de Reggan", 4th September 1959, n°2092/EMGDN/AE, Secret, 19760078/72, AN.
[43] Handwritten comment on a letter from the General Thiry to the Ministre des Travaux Publics et des Transports, "Restriction de survol au Sahara", 1st June 1961, n°1092/1/CIAS/S, Secret, 19760078/72, AN
[44] Arrêté n°2111 édicté par le Commandement Provisoire de la Zone de l'Ouest Saharien et la Subdivision de la Saoura. 19940390/60, AN.

in the Sahara were conditioned to an authorization for anyone aged 15 and older. To enter the forbidden zones, one had to obtain an authorization from the Commander of the region.[45]

These measures effectively excluded observers, spies, or wanderers, from the geographical vicinity of test sites. Oceanic test sites, on the Christmas Island and Polynesia posed different problems. Restricting entry was easier, since boats approaching the site would be spotted more easily. A 500km zone was established around the CEP, which was to be guarded by the police, although the problem would be "the numerous non inhabited islands were months-long stays can be done without being noticed".[46] No indication exists that French police were given the authorization to shoot without warning this time. The Christmas Island, for their part, were closed to unauthorized public, and so was the "danger area" defined by the British where aircraft and vessels could not enter.[47] The exclusion of outsiders limited the number of people able to gather knowledge about state activity on those sites. These geographical measures, however, were only part of the security apparatus deployed to distinguish insiders and outsiders around test sites.

c. Organizing security on nuclear sites: policing the audience

The second step in establishing the secrecy regimes was not geographical but organizational. It involved teaching and enforcing secrecy regulation at the local level, preventing espionage and leaks, and organizing the policing of test sites. Specific security regulations were developed. On test sites, an unusually large number of actors would be in contact with nuclear material, including young and untrained military personnel. One had to make sure they would not incidentally reveal strategic secrets. Espionage was a real possibility: the development of the necessary organizational means to counter was hence decided.

At the entrance of the *In Ekker* site, stood a billboard. "*Vous qui passez, passez sans me voir*" (You who are passing, pass without seeing) was written on it. On the other side of the road, facing those leaving

[45] Arrêté portant règlementation de l'entrée des Français et des Etrangers dans les départements du Sahara, 23 March 1962, SAH/EM.1/3084, 19940390/60, AN.
[46] Note pour le ministre des armées, "Moyens de maintien de l'ordre CEP", 8 March 1963, n°0985/EMFTOM/ES/TS, Très Secret, 19940390/45, AN.
[47] Nic Maclellan, *Grappling with the Bomb: Britain's Pacific H-Bomb Tests* (Acton: ANU Press, 2017), 198–99.

the site, another read "*Vous qui me quittez, oubliez moi"* (You who are leaving, forget about me). The *In Ekker* site, where France would conduct 13 underground tests, was intended to be as discreet as possible. We know little about security regulations inside Reggane but we know that it was supposed to be "neither a model nor a precedent" when *In Ekker* was built.[48] In *In Ekker*, employees were given 6-month security checks, and were instructed to avoid too much contact with the local population.[49] Around the center, visits and photography of installations were forbidden, and people entering the sector would be controlled.[50] Control over entry into the Sahara and zones surrounding the site grew stronger over the years. Conscripts were required to declare their photographic material, as well as the name and place of the person who would develop the films.[51] Pictures taken would then be checked, and sometimes classified, at times at the "Very Secret" (*Très Secret*) level if they featured buildings in which nuclear activities were taking place. The center, divided into a military and a CEA part, had different security services, and it was the CEA's own security services which were in charge of securing nuclear installations and firing areas.[52] Conscripts, for the most part, would not enter those zones, limiting the number of actors with access to nuclear data. Colored badges defined where one could go, and such badges had to be worn at all times to facilitate controls.[53] Inside the secret site, every move was regulated.

Things were not much different in Polynesia. Early reports from the military advised against the creation of a CEA-led security service, giving some measure of the competition between both groups. The CEA disagreed, and decided to go ahead with creating its service, among other reasons to ensure the proper screening of personnel working on the sites.[54] This did not apply to all employees, but only those who

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[48] Fiche "Sécurité du futur site souterrain d'expérimentation", 11th May 1960, n°34K120, Secret, S7231692;BCA-Mi-1-S-115-(184);BCA-Mi-3-S-115-(184), CEA/DAM.
[49] Cooper, "Saharan Fallout," 289; Ministère de la Défense, "Rapport Sur Les Essais Nucléaires Français (1960-1996). Tome I : La Genèse de l'organisation et Les Expérimentations Au Sahara (C.S.E.M et C.E.M.O)" (Confidentiel Défense, 1996), 148.
[50] Letter from Général Thiry to the Commander in Chief of Armed Forces in Algeria, "Sécurité du CEMO", 11th February 1961, n°302/1/ASP/S, Secret, 19940390/60, AN.
[51] One of such "engagement" form can be found in the Obsarm archives, box "Essais Sahara".
[52] Fiche "Sécurité du futur site souterrain d'expérimentation", 11th May 1960, n°34K120, Secret, S7231692;BCA-Mi-1-S-115-(184);BCA-Mi-3-S-115-(184), CEA/DAM. On this security service, see Chapter 4.
[53] Press clipping entitled "5-4-3-2-1-0 : La Bombe France Explose", box Essais Sahara, Obsarm Archives.
[54] Letter from the Director of the Essais department at the CEA, Rapport de mission à Papeete (Juin-Juillet 1963), 23th august 1963, n°26KA1314, Secret ATOME, 19940390/45, AN

would work with the Direction of Military Application on issues directly related to nuclear devices. Testimonies indicate that security was rather lax when it came to general construction work, due to the general shortage of personnel and the need to build the site fast. Their contract nevertheless included a pledge “not to divulge (…) any technical information, fabrication secrets, studies or discoveries he would have gotten to know” while working for the CEA.[55] Foreigners, in particular Chinese, were regarded with suspicion, and instructions were given not to reveal “any information about the activities and life on the site” to foreigners.[56] Similarly, after the May 1968 events, authorities expressed concern that metropolitan events would lead to the creation of unions, seen as an easy backdoor for foreign (and communists) powers.[57]

French regimes were similar to British ones. Although for *Hurricane*, the first British test, security was ensured only by regular security forces, inland sites had a stricter security apparatus. A series of outpost and security headquarters were established, and fencing was erected around specific parts of the site.[58] Not all parts of the site were equally secret. Issues encountered in the building of the Maralinga site hint at this inside hierarchy. A private company, Kwinana Group, was brought on to build most of the site, as it was considered that “for the bulk of the construction work no question of security arises”.[59] Contractors would “provide roads and concrete foundations for weapon tower and will erect photographic towers”, however, “for security reasons, the work of preparing the firing areas for the weapon trials, and of installing the equipment to be subjected to tests must be carried by a Service force”.[60] The firing areas were subjected to a higher level of control, and only authorized personnel could be in contact with nuclear devices. For the rest, onsite personnel were subject to precise security

[55] Contrat de travail de George Ueva, 21st June 1966, Obsarm Archives. For testimonies about the hiring conditions, see Renaud Meltz, “Construire Le CEP,” in *Des Bombes En Polynésie. Les Essais Nucléaires Français Dans Le Pacifique.*, ed. Renaud Meltz and Alexis Vrignon (Paris: Vendémiaire, 2022), 111–16.
[56] Note de Service Direction des centre d’expérimentation nucléaires, 24th April 1970, n°11/70/CDT, Confidentiel, CEA/DAM
[57] Procès-verbal de la réunion du comité de coordination du renseignement du 7 juin 1968, 8th June 1968, n°556/BE/CD/130, Confidentiel Défense, 19940390/144, AN
[58] “Report from the Royal Commission. Vol. II,” 438.
[59] Report by MOS team, “Construction of a permanent atomic proving ground in Australia”, 30th December 1954, Top Secret, AVIA 65/869, TNA.
[60] Telegram from the UK high commissioner in Australia, 22nd April 1955, n°442, Secret, AVIA 65/869, TNA; Brief for discussion with Mr. Menzies on the Atomic proving ground in Australia, undated (1955), Top Secret, AVIA 65/869, TNA.

measures. Instructions were that "camp life may be described, and there is no objection to acknowledging the presence of friends, or friends of friends, but no lists of scientific officers taking part or details of their tasks be given".[61] Security itself was the responsibility of the Long-Range Weapons establishment – at the Woomera range – and the Australian Department of Supply. This security organization "consisted of officers from ASIO [Australia Security Intelligence Office], security officers from the Department of Supply and members of the Peace Officer Guard Service."[62] As for the presence of the CEA security services, it demonstrates site as none of those services were by any means "regular". The Peace Officer Guard was a special corps created in 1942 to ensure the security of defense establishments. It was under the control of the Commonwealth Investigation Service, part of ASIO.[63] ASIO was Australia's security service and had only recently been created. Its creation is worth mentioning because it constitutes an example of how ensuring secrecy over test sites required much more than simply controlling the inside of the test: it required reinforcing the security powers of the state as a whole– at least at the local level – to ensure information control not only in, but also *around* the sites.

d. Spillover: secrecy and surveillance around the test sites

Benoît Pelopidas has noted that the link between nuclearization and surveillance has yet to be explored.[64] In this subsection, I respond to this invitation by showing how the installation of test sites has led to the development of state's capacity for surveillance. In Australia, ASIO was created, in large part, to keep nuclear knowledges on Australian soil secret. These knowledges were not just about nuclear tests. Australia "played a vital role in the atomic strategy of the postwar [British] empire from 1946 to 1957" beyond its nuclear test sites.[65] Moreover, Australia and the UK engaged in a "Joint-Project" of missile research, which focused on the development of long-range weapons at the Woomera range. Reynolds

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[61] Minute "Mosaic Joint trial Order Number One. Security – Briefing and De-Briefing", 2nd February 1956, n°1000Z, Restricted-Guard, AVIA 65/817, TNA.
[62] "Report from the Royal Commission. Vol. II," 438.
[63] Frank Cain, "Accountability and the Australian Security Intelligence Organization: A Brief History.," in *Security and Intelligence in a Changing World: New Perspectives for the 1990s*, ed. A. Stuart Farson, David Stafford, and Wesley K. Wark (London: Routledge, 1991), 107.
[64] Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, 279.
[65] Wayne Reynolds, "Atomic Weapons and the Problem of Australian Security, 1946–1957," *War & Society* 17, no. 1 (May 1999): 57.

argues that this cooperation, which started in February 1946, aimed "as far as the Australians were concerned, at the possession of nuclear deterrent weapons and their delivery systems".[66] The UK Atomic Energy Official Committee made an Australian nuclear program based on British research contingent on the presence of "stringent security precautions".[67] This was a first incentive for the development of stronger security infrastructure.

But most importantly, in 1948, the United States decided on a general embargo on classified information transfer to Australia, following revelations on Soviet espionage obtained through Venona.[68] The situation proved embarrassing for the British as well as for the Australians. Since the UK was cooperating with Australia on a project it could not carry out elsewhere, the safety of UK data depended on Australia's security. Although the US was not particularly involved in the Long-Range Weapons Project, it nevertheless joined the UK in pressuring the Australian government to reform its security infrastructure. Sir Percy Sillitoe himself, director of the MI5, was sent to Australia to convince the Prime Minister. It took months of negotiations – and a briefing on Venona, which showed unequivocally that members of Australia's security service had passed classified information to the Soviets – before he finally accepted. The Australian Security Intelligence Organisation was created in 1949, modelled on MI5 and unique in Australian history. The British authorities were heavily involved in the creation of this service, with an MI5 agent, Roger Hollis, being the prime adviser to the Australian Government on this task.[69]

ASIO was not created specifically to safeguard British nuclear testing activities in Australia. However, its creation was intimately linked to the Woomera Range, to which Emu Field and the Maralinga site were geographically attached. The reinforcement of the Australian state's ability to keep secrets

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[66] Wayne Reynolds, "Rethinking the Joint Project: Australia's Bid for Nuclear Weapons, 1945-1960," *The Historical Journal* 41, no. 3 (September 1998): 854.
[67] Cited in Reynolds, "Atomic Weapons and the Problem of Australian Security, 1946–1957," 68.
[68] The Venona project was a highly secret US intelligence project aiming to crack Soviet communication codes. It succeeded in decrypting 3000 messages, revealing the identity of many double agents. On this story, see Desmond Ball and D. M. Horner, *Breaking the Codes: Australia's KGB Network 1944-1950* (St. Leonards, NSW: Allen & Unwin, 1998).
[69] D. M. Horner, *The Spy Catchers. The Official History of ASIO, 1949-1963* (Sydney: Allen & Unwin, 2014), chap. 4.

coincided with the development of British nuclear activities in Australia. And soon enough, ASIO became involved in British nuclear testing. As early as 1952, two ASIO officers were seconded to the Department of Supply and were tasked "to ensure that those involved [in the Hurricane test] were not a security risk". After that, they were charged with vetting Australian workers at Maralinga.[70] Generally, ASIO would oversee security around the site and investigate potential spies on Australian territory who would want to get their hands on British nuclear data. But even then, British officials were hesitant to trust Australians. When planning for the *Totem* series, a British spy was planted in Australia and instructed to "report to [the UK High Commissioner in Australia] if he has any reason to suppose that local arrangements are not satisfactory."[71]

ASIO was not the only way nuclear site activity was kept secret. To control journalists, British officials also asked the Australian government to implement a D-notice system. Such a system was hitherto unheard of in Australia. The creation of D-notices in Australia coincides not with nuclear testing but, once again, with the installation of the Woomera Long Range Project. British pressures failed to convince Prime Minster Ben Chifley, but his successor, Robert Menzies, created the Australian system of D-notice in 1950.[72] A "Defense, Press and Broadcasting Committee" was created in July 1952 – right before *Hurricane* – to consider the implementation of D-notices regarding "Defense information" more generally. Although it was not created specifically to deal with nuclear testing, the issue featured prominently on its inaugural meeting agenda – in fact, it was the first item. Senior executive officers of the Australian press were members of this committee, but its Chair made clear that information would be released to the media in consultation with the British.[73] The existence of this notice itself was to be kept secret – and remained so until 1967, when British activities at Maralinga ceased.

French officials had a much more complicated relationship with the press: when in Polynesia, journalists were under surveillance, as intelligence reports show. D-notice systems, which require press

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70 Horner, chap. 4.
71 Cited in Tynan, *The Secret of Emu Field*, 36.
72 Elizabeth Tynan, "Atoms and Empty Space. Media and the Most Dangerous Scientific Experiments in Australia" (Doctoral Dissertation, Sidney, Australian National University, 2011), 139–41.
73 Tynan, *Atomic Thunder*, 222–24.

cooperation, but also state willingness to cut some slack, were foreign to the French "media system" historically characterized by a much more interventionist state, both in terms of censorship and subsidies, compared to the "liberal" British model.[74] When Associated Press leaked the news in late August 1960 that France was readying for a new test, the minister of Defense did not take things lightly and ordered an investigation, threatening the culprit with military courts.[75] After the first French test, three criminal investigation were launched against newspapers and journalists for divulging "national security secrets".[76] The publication of an article about an imminent explosion in December 1960 by renowned science journalist Nicolas Vichney made him a *persona non grata* at Reggane, on Messmer's order.[77] Test sites could not be approached without specific credentials. Several journalists were forbidden to even access Polynesian territory simply for having written "articles hostile to French nuclear experiments".[78]

As in Australia, the installation of French test sites in Polynesia coincided with a reinforcement of the state security apparatus in the archipelago. In this case, it is clear that the nuclearization of the Pacific was the driver. In Algeria, French personnel would have limited contact with the population, and so less chances of revealing secrets. In Polynesia, the situation was different. The local police force had a general policing function and was unfit for counterespionage – it could not even handle the sudden growth of the islands' population, especially if composed of young military personnel. It lacked manpower, and local intelligence networks were considered insufficient.[79] The installation of the *Centre*

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[74] On media systems and the differences between the British "liberal" and France's "pluralist" model, see Daniel C. Hallin and Paolo Mancini, *Comparing Media Systems: Three Models of Media and Politics* (Cambridge ; New York: Cambridge University Press, 2004), chap. 4.

[75] Handwritten notes from Paul Delouvrier, general delegate from the Government in Algeria, entitled "Messmer", 27th August 1960, 3DV-DR8, CHSP. An investigation indeed took place, identifying a possible source.

[76] «Trois informations ouvertes pour divulgation des secrets de la bombe de la bombe A », *Le Monde*, 21st February 1960.

[77] Patrick Eveno, *Histoire Du Journal Le Monde, 1944-2004* (Paris: Albin Michel, 2004), 199. "La troisième bombe atomique française serait prochainement expérimentée au Sahara", *Le Monde*. 15th December 1960; "La prochaine explosion atomique. Des poursuites pour divulgation de secrets militaires", *Le Monde*, 16th December 1960,

[78] Liste des étrangers faisant l'objet d'un arrêté d'interdiction d'entrée en Polynésie française, 26th June 1974, 19940219/27, AN.

[79] Conclusions tirées de la reunion du 14 mai 1963 relative au contrôle des installations du CEP et de l'Archipel des Tuamotou par la Gendarmerie, 21st may 1963, n°5348/EMA/ORG.2/A.13, Très Secret, 19940390/45, AN ; Rapport "La Polynésie Française à la veille des élections présidentielles et des expérimentations nucléaires", April 1965, 19940227/16, AN

d'Expérimentation du Pacifique (CEP) would bring new attributions such as the "close control" of the population, foreign and local.[80] In a report about the repercussion of the CEP on local police's missions, the author noted that it had become clear that "the life of the territory (…) will be fully transformed".[81] Certain archipelagos which had so far escaped police control entered the area of surveillance patrol, while the number of *Gendarmerie* officers was raised.[82] The "*Bureau d'Etudes*" of the Polynesia governorate, which ran police surveillance on the island, soon "essentially work[ed] for the CEP", producing weekly reports on all noteworthy events on the archipelago, and including specific "CEA" and "CEP" section.[83] In the words of its official historians, "the installation of the CEP reinforce[d] the State's grasp over Polynesia".[84] The installation of the Australian also reinforced the State's ability to safeguard nuclear secrets in the middle of the Pacific Ocean, and to keep its population under surveillance

e. The hour of the test: choosing the audience

These efforts to keep secrecy in and around test sites clashed with the inherent noticeability of atmospheric nuclear explosions. Some might see the cloud from a distance, or hear the noise by chance, that was inevitable. Had all those efforts to keep secrets around test sites been in vain? Not really. The only thing anyone can learn from seeing or hearing an explosion from afar – and it would have to be from afar, the zone around the site being closed – is that an explosion happened. This was already common knowledge. British and French officials had given up on hiding their intention to conduct nuclear tests. If one came prepared, however, they might be able to retrieve more data. To prevent this, officials chose the second-best strategy: to dissimulate the exact moment of the test to prevent the formation of an unauthorized audience.

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80 Note pour le ministre des armées, "Moyens de maintien de l'ordre CEP", 8 march 1963, n°0985/EMFTOM/ES/TS, Très Secret, 19940390/45, AN
81 Rapport sur les répercussions sur les missions de la Gendarmerie à la suite de l'implantation d'une base d'essais d'engins nucléaires en Polynésie française, n°28/4, 8 march 1963, Très Secret, 19940390/45, AN
82 Note "Contrôle de l'archipel des Tuamotu", 7th May 1963, n°5309/EMA/ORG.2/A.13, Très Secret, 19940390/45, AN ; Fiche sur le renforcement de la gendarmerie en Polynésie Française, 16th May 1963, n°587/CAB/MIL, 19940390/45, AN.
83 Letter from Général Thiry to the Chef d'Etat Major de la Marine, 23rd April 1964, Secret, 19940390/45, AN
84 Renaud Meltz and Alexis Vrignon, "Introduction Générale : La Rencontre de Deux Mondes.," in *Des Bombes En Polynésie. Les Essais Nucléaires Français Dans Le Pacifique.* (Paris: Vendémiaire, 2022), 19.

i. *"In the event of a hitch": saving face strategies for first nuclear tests.*

It is sometimes argued that nuclear testing is a kind of a form of spectacle, a global display of one's ability to master the nuclear craft.[85] In this argument, nuclear testing, and particularly the first nuclear test, is meant to be visible. Some facts seem to support this claim in my cases. For example, in a June 1958 letter to Charles de Gaulle, Pierre Guillaumat rejected underground testing, arguing that France "cannot renounce proceeding to one or two atmospheric nuclear explosions". Such explosions had technical and tactical relevance, notably the training of military units for tactical exercises in an atomic context and the testing of materials' resistance to actual explosion. But such experiences could also produce the "spectacular" effect which made "propaganda via cinema and photography" possible and give "the feeling that our country had reached the rank of atomic military power". [86] Guillaumat's plea shows that it was not the first test itself that was made to be visible, but its *images*. For fear of failure, both France and the UK tried to maintain utmost secrecy around their first test, to make sure that only a selected few would see it – and that "in the event of a hitch", humiliation would be limited.

The first British test, in spite of its official announcement, advanced under a guise of deception. The atomic device was transported by sea aboard the *HMS Plym* in the greatest secrecy. The boat was signed with the initial TV, military acronym for "target vessel", which opportunely could also mean "television vessel". What a convenient cover for a secret journey! To add to the realism, the frigate was apparently "hung with a lookalike television antennae" before being shipped through the Pacific.[87] Months before the test took place, a British Lord asked Churchill whether he could state the approximate date of the explosion, to which the Prime Minister answered negatively, emphasizing the "useful uncertainty about the exact nature of our test".[88] Churchill later instructed "to mount an operation to deceive the enemy about the time of trial (…) to convey the impression that the trial will in fact take place about five weeks

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[85] For example, Robert Strong, "The Nuclear Weapon States: Why They Went Nuclear," in *Nucler Proliferation in the 1980s. Perspectives and Proposals.*, ed. William H. Kincade and Christoph Bertram (London: Palgrave Macmillan, 1982), 4.
[86] Letter from Pierre Guillaumat to Charles de Gaulle, "Limitation des explosions nucléaires", 30th June 1958, n°403/MA/CAB/ARM, Très Secret, INVA 303, AMAE. Thanks to Chloë Mayoux for this document.
[87] Denys Blakeway and Sue Lloyd-Roberts, *Fields of Thunder: Testing Britain's Bomb* (London ; Boston: Unwin Paperbacks, 1985), 59.
[88] Blakeway and Lloyd-Roberts, 56.

later than the actual target date". The Australian Royal Commission noted with irony that it "was never informed of the identity of 'the enemy'".[89] The Royal Commission's irony was misplaced: Churchill had a clear idea of who the enemy was, and he was not alone in thinking so. As historian Huw Dylan showed, the deception operation Churchill ordered was long in the making and followed a strategic rationale: to prevent Soviet sabotage and espionage. Various measures of deception, particularly false leaks to the Press, were used to obscure the nature of the test – an explosion in shallow water – and to create the illusion of a delayed test.[90] Catching the Soviets off-guard was hoped to leave Moscow "with incomplete plans for sabotage or espionage".[91]

However, many elements point to the fact that "the enemy" was not the only one to be kept in the dark. No journalist was allowed to attend the test. In a February 1952 letter to the Prime minister's department, a civil servant wrote in favor of the exclusion of the press arguing that "the trial is the first scientific test of a new British weapon in its experimental form. Success cannot be guaranteed and failure in public even if temporary, would be damaging." Cherwell concurred: "The presence of any pressmen or outside spectators, whatever precautions were taken, would be dangerous to security and gravely embarrassing in the event of a hitch"[92] Secrecy also facilitated public relations. On the side, "special care should be taken to ensure that the best possible arrangements are made for a good service of official communique".[93] In a written answer to a parliamentary question, the Prime Minister assured that "arrangements will (…) be made to give out the fullest suitable information after the test has taken place". Interestingly, the original draft answer proposed to "give out the fullest information *possible*", a word eventually replaced by *suitable* on Churchill's decision.[94] In the end, those outside the British

[89] Cited in "Report from the Royal Commission. Vol. II," 460.
[90] Huw Dylan, "Operation TIGRESS: Deception for Counterintelligence and Britain's 1952 Atomic Test," *Journal of Intelligence History* 14, no. 1 (January 2, 2015): 1–15.
[91] Dylan, 11.
[92] Minute from Cherwell to the Prime Minister, "Atomic Weapon Test – Attendance of Ministers", 21st February 1952, PREM 11/293, TNA.
[93] "Report from the Royal Commission. Vol. II," 462.
[94] Draft written answer to a parliamentary question, 10th April 1952, PREM 11/293, TNA; Letter from E.G.C to J.R. Madge, 7th April 1952, PREM 11/293, TNA.

nuclear complex who could witness the first test were a carefully selected trio of Australian scientists: Ernest Titterton, Leslie Martin and Alan Butement. I will return to these men later.

Anxiety about possible failures seem like a distinctive feature of the "first test". For countries like Britain and France, for whom a nuclear program was as much – if not more – a matter of status as of security, failure would have humiliating consequences and betray an inability to live up to one's great power identity. Making sure that attendees were selected individuals was a face-saving strategy for declining powers lacking confidence, torn between imperatives of publicity – how else would the world know about it? – and secrecy – what if the world witnessed a failure? French preparations for *Gerboise bleue* show a similar tension. As described, France had declared two no-fly-zones over the Sahara: one permanent, the other temporary. While the permanent zone may have been created to hide the site from public view, the second had different objectives, namely "to disrupt in the least possible way the aerial traffic military or commercial; to ensure the safety of every plane even in case of failure of radio communication; *to preserve, if possible, secrecy over the date of explosions*."[95] The temporary nature of this zone posed a problem: normally, a public Notice to Airmen (NOTAM) had to be issued 24 hours before the arrival of a plane in the dangerous zone. However, "such advance notice would not be compatible with the conservation of secrecy over the hour of experimentation". So "to reconcile the two imperatives [secrecy and security for the planes], the first interdiction notice will be formulated only 7 hours before the shot".[96] Subsequent protests from the Ministry of Transportation raised the public notice to 12h.[97] Moreover, "to ensure secrecy over the date of the tests, it is necessary that the flyover authorization becomes mandatory several months before the test".[98] This would make it impossible to know if a test was about to take place, or if it was simply an exercise. One such exercise took place only a few weeks before the first test.[99] This strategy had a clear goal "to let doubt linger over the actual date

[95] "Restrictions de vol au Sahara pendant les essais sur le champ de tir de Reggan", 9th September 1959, n°1222/Asp/2/S, Secret, 19760078/72, AN (emphasis added).
[96] *Ibid*.
[97] Letter from the Ministre des Travaux Publics to the Général Ailleret, "Exercice Gerboise", 18th November 1959, n°80/S/DNA/1, Secret, 19760078/72, AN.
[98] "Restrictions de vol au Sahara pendant les essais sur le champ de tir de Reggan", 9th September 1959, n°1222/Asp/2/S, Secret, 19760078/72, AN.
[99] "Un exercice d'alerte et d'interdiction du survol de la zone de Reggane a été déclenchée jeudi soir", *Le Monde*, 23 January1960.

of nuclear experiments and possibly dissimulate possible failures."[100] When, in October 1959, the *Daily Herald* revealed that the French planned a nuclear test during the first trimester of 1960, General Buchalet conducted an investigation out of fury.[101] The explosion itself would take place in front of a selected audience. As a symbol of France's willingness to sell the atomic explosion as the "bomb of the [French] Community", it invited various African leaders to attend the test.[102] Originally, the CEA did not even want the representatives of the French Community to attend, fearful of potential risks, but public relations concerns prevailed.[103] The press did not attend – the first press travel to Reggane was in March 1960, after the explosion[104] – but the Ministry of Armies produced its own reporting on the event to be distributed.[105] As for the British, French officials selectively chose their public for the first test.

ii. Protecting packages, taming critics: maintaining secrecy after the first test

If the exceptional level of secrecy surrounding the date of the first test can be explained by concerns about losing face, how did states behave in later ones? First tests were exceptions: afterwards, carefully selected reporters started to be invited to witness the tests and report about them. In Australia, the list of scientists allowed to attend and gather data about the tests grew over the years. These scientists were allowed to attend the tests, and progressively gained more access to weapon data, at the condition they were vetted beforehand.[106] External observers were also invited. But neither French nor British officials departed from a strategy of maintaining doubt about the date of incoming tests. This policy had two goals: ensuring the security of the materials transported to the sites and forestall contestations.

Test sites in Australia and the Pacific required the transport of nuclear-related devices to the other side of the world. Drawing attention to the date of the test meant risking unwanted attention for such transports. Even before proceeding to tests in Polynesia, French nuclear test planners noted it would be

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[100] Note pour le Premier Ministre, "Réglementation de la circulation aérienne au-dessus du Sahara en fonction de projets d'essais nucléaires français", 6th November 1959, n°2614/EMGDN/AE, Secret, 19760078/72, AN.
[101] Pô, "La DAM Du CEA," 217.
[102] Cooper, "Saharan Fallout," 218.
[103] Chloë Mayoux, "Le Soutien Britannique Aux Essais Français Pendant La Décolonisation Africaine (1959-1960): Un Paradoxe," *Relations Internationales*, no. 194 (2023): forthcoming.
[104] "La première bombe atomique française (Reggan – 13 février 1960", Notes et études documentaires n°2.648, *La documentation française*, 21 March 1960.
[105] Reportage Ministère des Armées "Le Sahara à l'heure atomique", undated (february 1960), 569AP/105, AN
[106] Letter from T.B. Le Cren to J.M. Wilson, 7th June 1955, AVIA 65/817, TNA.

impossible not to announce the tests since they would require a "public notice to sailors (…) [and] an important operational force (…) cannot be discreet" anyway.[107] Secrecy, however, could make sure that the immediate audience of those tests remained limited. For this reason, French officials decided that a NOTAM should not be issued too early in Polynesia, to prevent the boats and long-couriers with nuclear materials from being spotted.[108] The route also mattered. When flying the test weapons to the Christmas Island, British planes used a westabout route designed to avoid flying nuclear weapons over the Middle East "so soon after the Suez war".[109] French vehicles also had to avoid Commonwealth territories as the UK was very uneasy with the possibility of French boats or planes passing through Commonwealth countries; their obligations under the PTBT required them not to encourage any country in the conduct of nuclear test. They hoped that "[the French] will not embarrass us by seeking clearance for flights which are connected with their nuclear test programme".[110] Moreover, not announcing the test meant that more efforts would be needed to monitor and spy on the tests. This is important especially if we consider the problem of hiding yields, and the fact that (rough) yield estimates can be made from a look at the angular size of the fireball, an exercise which requires a certain proximity with the test.[111] This, however, was a failure, as I will discuss later.

Secrecy over the date of tests served a second goal: taming critics. During testing in the Pacific, the British Foreign Office was particularly anxious to prevent neighboring states from knowing when it would test nuclear weapons. British officials wanted to keep the dates of testing secret "until very late in the day" because they were aware of the growing contestation in the Pacific, notably from New Zealand, Australia and Japan. Japanese oppositions worried particularly the British government, which had withdrawn its compulsory acceptance of ICJ jurisdiction for fear of a Japanese lawsuit.[112] Even after

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[107] Fiche Entraves possibles particulièrement préjudiciables aux essais du Pacifique, 23 octobre 1963, DAM/ESSAIS/DO 26KA1558, CEA/DAM.
[108] Centre d'expérimentation du Pacifique, Fiche n°1, Examen des contraintes, DAM/SDE, S7506783, CEA/DAM ; Meltz, "Sous Le Signe Du Secret," 218–19.
[109] Arnold and Pyne, *Britain and the H-Bomb*, 139.
[110] Telegram to Paris Embassy, FO(S)/CRO(S)/WH(S), undated (April 1966), PREM 13/3206, TNA.
[111] Herbert York, observer to British tests in the Christmas Island, reported to have estimated the yield in this way. Norman Dombey and Erik Grove, "Britain's Thermonuclear Bluff," *London Review of Books*, October 22, 1992, https://www.lrb.co.uk/the-paper/v14/n20/norman-dombey/britain-s-thermonuclear-bluff.
[112] John R Walker, *British Nuclear Weapons and the Test Ban (1954-1973). Britain, the United States, Weapons Policies and Nuclear Testing: Tensions and Contradictions* (London: Routledge, 2019), 22.

announcing its intention to test, it kept its preparation highly secret. The installation of the radiation monitoring system was made difficult by London-based officials' reluctance to inform others in the colonies. Minutes from the Atomic Weapons Trial Executive Committee were sometimes not fully recorded to maintain secrecy over certain details. When it came to the proclamation of the Danger Area, the Foreign Office even proposed closing the waters without public notice – betting that the on-site Task Force Commander would manage to "persuade any intruders to leave the danger area if they are found on the high seas".[113] Some in Japan nevertheless threatened to send a "suicide boat" in the danger area in order to foil a test. To prevent this, the British government once again resorted to deception. Chapman Pincher was approached and agreed to fake a story in the *Daily Express* which implied that the *Grapple* tests had been delayed due to technical problems.[114] In fact, in a briefing on the security classifications of operation *Grapple*, only one item was considered Top Secret: "the methods and the route to be used for transporting weapons".[115] With all the trouble the British had gone through, it must have been disappointing when they blew their cover in an instant when the aircraft carrying the fissile material ball for the first test-weapon lost radio contact over US territory on its way to the islands, creating panic inside the USAF and becoming a topic of mockery for local radio stations and newspapers.[116]

When facing African contestation, French officials resorted to similar strategies. *Gerboise Rouge* (27 december 1960) and *Gerboise Verte* (25 April 1961) took place in the context of growing political tensions. Mali had gained independence; African contestation of French tests had exacerbated. Ghana and Nigeria apparently threatened to sever diplomatic relations with France if it proceeded to a third test.[117] It was decided not to attract too much attention to those explosions, which, incidentally, would also be of lesser yield. Any yield, however, would be significant enough to require a NOTAM to be issued. However, the zone of aerial exclusion used to include parts of now-independent Mali. To

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[113] Maclellan, *Grappling with the Bomb*, 123–24, 197, 199.
[114] Blakeway and Lloyd-Roberts, *Fields of Thunder*, 152. Alan Rimmer argues that a body double of William Penney was even used to convey the impression that he was in Australia planning for a new test in the bush. Alan Rimmer, *Between Heaven and Hell.* (London: Lulu.com, 2012), 62.
[115] Operation Grapple – Security Classification, R153/003, A6456, NAA.
[116] Rimmer, *Between Heaven and Hell.*, 63–64.
[117] Interview with Jacques Martin, former France Ambassador, 11th January 1989, 551AP/14, vol. IV, interview XXV, AN, 42.

circumvent that problem, a different procedure was secretly put in place, without consultation with the Direction of Civil Aviation. It was designed to keep the government's intention to proceed to nuclear tests discreet by shortening the time for warning, out of "of political consideration, aiming to ensure the psychological and diplomatic covering of our experiences".[118] These measures did not prevent the press from announcing an incoming test – it was, in fact, this test which triggered Messmer's aforementioned outrage and Vichney's banishment from Reggane. According to Yves Rocard, the French leadership was frequently tempted to cease using secrecy over the timing of the tests, including in Polynesia. But they eventually decided against this, "for fear of provoking hostile demonstrations". Rocard, for his part, apparently leaked the info to other scientists anytime he could, as he considered his colleagues "easy accomplices and discreet".[119]

Hiding the test's date meant controlling its public. It offered a way to control the media narrative, a fact better illustrated by the first UK H-bomb test, *Orange Herald*, in May 1957. Because the time difference would not have allowed reports to publish a report in the morning press right after the test, they were given an official briefing and asked to write their article on this basis. Information was given with the specific intention to lure the public, considering the symbolic importance given to the first British H-bomb test.[120] It must be noted that such strategies were not without risk. On the 27th December 1960, when the *Gerboise Rouge* test took place, Air France was apparently terrified by the short notice which, in their assessment, could have led planes to fly over the forbidden zone at the time of the explosion.[121] In 1957, when preparing for Operation *Grapple*'s first shot, a Liberian freighter sailed close to ground zero around the time of the detonation because the warning to mariners had not been sent in time.[122]

They were not without flaws, either. In the 1950s and 1960s, techniques in nuclear forensic analysis were already advanced and allowed one to reconstitute the design of a given device based on the isotopes

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[118] Letter from the Général Thiry to the Minister of Travaux Publics et des transports, 15th March 1961, n°0589/1/Asp/S, Secret, 19760078/72, AN.
[119] Rocard, *Mémoires*, 222, fn. 1.
[120] Dombey and Grove, "Britain's Thermonuclear Bluff."
[121] Letter from Air France to the Ministre des Travaux Publics et des Transports, "Zones interdites de Reggane", 20th February 1961, DE.ON/96.401.AP, 19760078/72, AN.
[122] Wilfrid E. Oulton, *Christmas Island Cracker: An Account of the Planning and Execution of the British Thermo-Nuclear Bomb Tests, 1957* (London: Thomas Harmsworth Pub, 1987), 3–4.

it produced.[123] In 1953, the USSR began taking systematic daily measurements of atmospheric fallout, allowing the Soviets to spy on US, but also British, tests, from afar. By 1954, this became a large-scale operation, with regular sample-collection flights and debris collectors also being installed in China.[124] Whatever strategic secrets the British were trying to hide from the Soviets, their ways of going about it were largely inefficient by this time. Archives about French tests in Polynesia reveal the continuous presence of American, Soviet, or British ships around the sites, at the limits of the exclusion zone, at the moment of tests.[125] French officials were fully aware of this. De Gaulle and other military officers took pride in such surveillance, taking it as an indication of the attention granted to them by other major powers.[126] Intelligence reports show that local French intelligence officers monitored closely what was going on, frequently inspecting suspicious soviet ferries, only to find measurement equipment on board. Something, however, had escaped their radar: they were convinced that the US presence was simply the result of an assessment of meteorological conditions suitable for testing.[127] It was not. The US had in fact cracked France's communication codes…[128]

This section showed how the installation of nuclear test sites came with a rise in state's organizational capacity for information control, that is, in its ability "to make sure that certain people will or will not have access to certain information at certain times."[129] This involved three elements: the making of nuclear test sites as secret places, whose activities were out of the knowable world; the development of a security apparatus, to ensure that this secret status would be enforced; and attempts at concealing the most obvious of all activities, nuclear tests, by obfuscating the actual moment when they would happen.

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[123] Vitaly Fedchenko, ed., *The New Nuclear Forensics: Analysis of Nuclear Materials for Security Purposes* (Oxford, United Kingdom: Oxford University Press, 2015), 6. De Geer, for example, has shown how the radioactive signature of hydrogen bombs could allow analysts to deduce its two-stage design. Lars-Erik De Geer, "The Radioactive Signature of the Hydrogen Bomb," *Science & Global Security* 2, no. 4 (1991): 351–63.
[124] Vitaly Fedchenko and Robert Kelley, "The Origins of Nuclear Forensic Analysis I: The United States and the Soviet Union," in *The New Nuclear Forensics: Analysis of Nuclear Materials for Security Purposes*, ed. Vitaly Fedchenko (Oxford University Press, 2015), 179.
[125] US submarines were even spotted. Bulletin particulier de renseignements, "Activités aériennes et maritimes américaines entre le 10 et le 22 juillet 1966", 28th July 1966, n°85/CEP/EM/RENS/SC, Secret/Confidentiel, GR 13 R 152, SHD.
[126] "Les Expérimentations Nucléaires Françaises. Table Ronde Du 12 Juin 1992," 115–16.
[127] Vice-Amiral Lorain to the Général Thiry, Compte-rendu sommaire du déroulement de la 2e demi-campagne, 23rd October 1966, n°110/GOEN/OPS/S, Secret, GR 13 R 152, SHD.
[128] SAC Reconnaissance History, January 1968-June 1971, 7th November 1973, Secret, available at: https://nsarchive2.gwu.edu/NSAEBB/NSAEBB184/FR28.pdf.
[129] Wilsnack, "Information Control," 468.

In doing so, state officials acquired a certain ability to control the public of their activities, those who could know and those who could not. Evidence of espionage activities around the sites indicate that these efforts were in vain: an uninvited public inevitably formed, although what knowledge it acquired remained secret. Strategic secrets were easily accessible for other state actors. In fact, the public directly affected knew less than American or Soviet officials about actions of their own states.

2. The impossible control: secrecy, fallout, and the production of irresponsibility

How did the strict information control regime designed to keep strategic secrets affect democratic control? In the previous section, I focused on the technical data related to nuclear testing. In this section, I turn to the problem of fallout, risk exposure and harm caused by those tests. Fallout constituted a strategic secret, in the sense that the analysis of nuclear debris could reveal certain things about bomb designs. But more than this, they were "dark secrets". Dark secrets are closely linked to Goffman's concept of "face", the image of self an actor wants to project to the audience. He defined them as "facts about a team which it knows and conceals, and which are incompatible with the image of self that the team attempts to maintain before its audience." As Goffman underlines, dark secrets are "double secrets". Unlike strategic secrets, what is hidden is not just a specific set of information, but also the fact that such information is being hidden.[130]

Right after Hiroshima, radioactive contamination had gotten some press, but it was really after Castle Bravo, in 1954, that international contestations took off, culminating in the PTBT.[131] Because British and French officials had decided to test anyway, they tried to maintain face by keeping up the image of "clean" testing. As Joseph Masco put it, they had "to rationalize the constant production of mushroom clouds and the related health concerns over radioactive fallout".[132] This section aims to show how modes of democratic control were affected by nuclear secrecy, and how it allowed state officials to escape

[130] Goffman, *The Presentation of Self in Everyday Life*, 141–42.
[131] Toshihiro Higuchi, *Political Fallout: Nuclear Weapons Testing and the Making of a Global Environmental Crisis* (Stanford: Stanford University Press, 2020); Laura A. Bruno, "The Bequest of the Nuclear Battlefield: Science, Nature, and the Atom during the First Decade of the Cold War," *Historical Studies in the Physical and Biological Sciences* 33, no. 2 (2003): 237–60.
[132] Joseph Masco, "'Survival Is Your Business': Engineering Ruins and Affect in Nuclear America," *Cultural Anthropology* 23, no. 2 (May 2008): 378.

deliberation, oversight and accountability. It makes three interrelated points. First, discussing external controls over nuclear testing, it shows how the processes of audience exclusion described in the previous section prevented external actors from knowing enough to expose the states' "dark secrets". Second, studying internal oversight mechanisms, it shows that these were flawed from the beginning, because they were designed in such way that only actors with vested interests were involved, and because information given to those actors was distorted. It shows, particularly, the role of what Goffman calls "shills" in the failure of those mechanisms. Third, looking at the production of data regarding fallout, it argues that the accountability, although not impossible, was inherently flawed due to the conditions of knowledge production flowing from test site secrecy regimes. It concludes, in other words, on the absence of democratic control over risk exposure and state harm related to nuclear development in France and in the UK.

a. External control: the impossibility of challenging state narratives

External control over nuclear tests jeopardized a cornerstone of official discourse about nuclear tests: that they were safe and that everything was under control. British and French officials, in different contexts, worked hard to establish this narrative, which revolved around two similar claims: tests were harmless, and internal oversight guaranteed their safety. Both were untrue. This meant the public had flawed information in deliberating over tests. The total dependence of external controllers, particularly journalists, on state-controlled information was such that this narrative was impossible to check. What is more, it made it possible to hide blunders from public view when they occurred.

i. Rationalizing the production of fallout, flawing deliberation

When the first British test took place in Australia, in 1952, public knowledge about fallout – particularly outside the United States – was relatively limited. In fact, tests were themselves designed to gain understanding of the phenomenon, considering that war and civil defense planners outside the US had to rely mostly on American open sources to find out about its effects. This provided an incentive to keep secrecy over explosion effects: they were valuable information which could help an adversary. Consequently, although the dangers of radioactivity were known to the public, those of nuclear testing were largely ignored and British officials did not feel compelled to justify the safety of their tests to the

Australian public. Still, nuclear tests were not entirely of uncontroversial nature of nuclear tests. Prime Minister Menzies felt "some categorical and authoritative statement will be necessary that the effects will be innocuous" – the British obliged.[133] For the *Totem* series, a similar statement was issued, promising that the safety of Aboriginal people was assured. This kind of claim would be common throughout the campaigns of nuclear testing, coming from British as well as French officials.

After Castle Bravo, however, nascent public opinion about the risks of fallout challenged experts' reassurances about safety. A 1957 poll showed that 49% of Australians opposed testing, while only 37% supported it.[134] It is likely that these concerns grew out of concern by Australian citizens for their own health, rather than for the Aboriginal people.[135] In 1956, a rumor that the cloud of the second shot of the Mosaic series was drifting towards Australian cities spread among journalists at Maralinga, sparking panic. It was later disconfirmed, but the panic was not easily soothed by communication efforts.[136] In the face of these nascent contestations, both at home and in Australia,[137] British officials developed a discourse insisting upon the innocuity of testing, and repeatedly and systematically assured that no harm would befall the population of Australia.[138]

Rationalizing the production of fallout not only meant minimizing risks, but it also implied convincing the public that those risks were taken seriously and that tests would not happen without oversight. The creation of the Atomic Weapons Tests Safety Committee (AWTSC), in 1955, was part of this effort. Its creation was a demand of the Australian government, to ensure a measure of oversight by Australian scientists over the tests. Although Australian scientists had been present during the first two series, they did not attend in any official capacity. Nevertheless, in a message to a member of the UK High

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133 "Report from the Royal Commission. Vol. II," 449.
134 Poll published in *The Sydney Sun*, 13th June 1957.
135 Legally, Australian Aboriginal people were not considered "citizens" but "colonial subjects" until 1967. Sylvie Poirier, "La Différence Aborigène et La Citoyenneté Australienne: Une Conciliation Impossible?," *Anthropologie et Sociétés* 33, no. 2 (February 23, 2010): 101.
136 Tynan, *Atomic Thunder*, 101–2. G2 would remain the most controversial of all British nuclear tests in Australia. See Zeb Leonard, "Tampering with History: Varied Understanding of Operation Mosaic," *Journal of Australian Studies* 38, no. 2 (April 3, 2014): 205–19.
137 Christoph Laucht, "Scientists, the Public, the State, and the Debate Over the Environmental and Human Health Effects of Nuclear Testing in Britain, 1950–1958," *The Historical Journal* 59, no. 1 (March 2016): 221–51.
138 Arnold and Smith, *Britain, Australia and the Bomb*, 148–51.

Commission in Australia, a civil servant insisted that the communique about the AWTSC creation should not give the impression that "the "full and independent check" was a new factor in Australia's agreement to any further atomic trials whereas the calculations about the safety of the two previous trials were, in fact, check[ed] by Australian professors."[139] As historian Tim Sherratt writes, "the Safety Committee's role was as much concerned with public relations as it was with scientific safeguards".[140] This means that, when deliberating over tests, British officials gave neither the British nor the Australian public any accurate information.

French officials took a similar approach to presenting fallout as a phenomenon under control, first during the diplomatic debates with African diplomats, and again when building the CEP. By the time French officials went public with their intention to test, the three existing nuclear powers had agreed on a moratorium on atmospheric testing. Selling the tests as harmless would be a more demanding task. French officials had to face diplomatic contestations and then, domestic ones. Diplomat Jules Moch repeatedly stressed in front of the UN that tests would be safe, showing notably a map of existing test sites to demonstrate how far Reggane was from inhabited areas. He also pointed out the differences between French – nuclear – tests and the *Bravo* – thermonuclear – disaster.[141] French officials similarly signaled their concern for safety by insisting that meteorologists would give the go-signal, implying that political haste could not lead to a shot in unsafe condition.[142] They also made sure that debates in France remained minimal. In 1963, when asked by an elected representative about the level of fallout over France caused by Soviet nuclear testing, the Minister for Research and Atomic questions refused to answer. Indeed, the Minister considered it inopportune to raise the question of the origins of fallout: "'they' would not miss the occasion, in particular, to take an interest particularly about the creation of French fallout."[143]

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[139] Letter from J.M Wilson to G. Kimber, 21st March 1955, Ext198, Secret, AVIA 65/817, TNA.
[140] Tim Sherratt, "A Political Inconvenience: Australian Scientists at the British Atomic Weapons Tests, 1952-53.," *Historical Records of Australian Science* 6, no. 2 (1984): 137–52.
[141] Cooper, "Saharan Fallout," 42–43.
[142] "Les météorologues donneront le signal de l'explosion de la bombe française", *Le Monde*, 11th February 1960. The exact opposite happened: political decision drove the decision and it was shot in unsafe conditions.
[143] Letter from Yves de La Prairie to Jean Charbonnel, 1st August 1963, CHA29, CHSP.

A similar effort to downplay the dangers of the tests took place in Polynesia. In 1964, confronted with hostility toward the Prime Minister during his visit of the territory, officials decided to reinforce the state "information-propaganda" about the CEP.[144] In 1966, public authorities decided to publish a leaflet, both in French and in English, entitled "French nuclear experiments in the Pacific", intending to convince the public of the safety of upcoming experiments. It showed maps similar to those Jules Moch had presented to the UN, updated for Polynesia, and stressing the distance – even, the emptiness – of the test zones. The leaflet was presented as the product of a joint enterprise between the Armies, the CEA, and "public health authorities", under the authority of the *Commission de sécurité des sites* (Consultative Committee for Test Site Safety). The leaflet intended both to bring the existence of oversight institutions to public attention, and to assure them of the experiment's innocuity. However, this leaflet contained several inaccuracies, largely downplaying the risks while exaggerating the levels of natural radioactivity, which made the hazards of testing look relatively small.[145] Before the first test in Polynesia, CEA High Commissioner Francis Perrin declared that the only radioactivity risk posed was the rise in consumption of radium watches since the CEP would significantly enrich the region.[146] Attempts to rationalize fallout by comparing it to the risks of background radioactivity were not new. British officials had suggested in 1956 to show to some journalists the effects of a Geiger counter over a "luminous wristwatch" or a "medical radium needle", in order to convince the press that they have "always lived with radioactivity and that some ordinary things give a click".[147] Moreover, the identity of those cited "public health authorities" remained unclear. As noted in correspondences from those authorities, no one from the Ministry of Public Health sat on this committee. A physician from the CEA, Louis Bugnard, however did. Hoping to present this commission as serious and independent, public officials played on the ambiguity.[148] French authorities later issued "White books", in French and in English, about their nuclear experiments, in which the safety aspect was underlined. Just like in the

[144] Note sur la visite du Premier ministre en Polynésie, 8 August 1964, 19940227/16, AN.
[145] An annotated version of the leaflet, covered with Pierre Pellerin's correction in red, can be found in the box 19760161/009, AN.
[146] "La campagne d'expériences nucléaires est ouverte à Mururoa", *Le Monde*, 30th June 1966.
[147] Telegram from Lloyd to Wheeler, n°LM 6715, DEFE 16-582, TNA.
[148] It enraged civil servants in the Ministry of Health who saw this as an attempt to use their credit to mislead the Polynesians. Note à l'attention de Monsieur Paye relative à la Commission Consultative de Sécurité des sites, 11 juillet 1966, 19760161/009, AN.

British case, information given about the risks created by tests was not accurate, and flawed deliberation. It was done on purpose: nothing that could have derailed testing plans was allowed to be public.

A brief look at how officials planned to talk to the public about nuclear testing only confirms this impression. Even before tests took place, the policy was to announce that everything "proceeded to plan" and that fallout "went according to our previsions". Whether this was actually true was not the priority. For France, a 1966 note on the CEP's "Information policy" gives a single criterion, worth quoting in full:

> "Regarding the information which can be made public locally without going through the Paris intermediary, it seems to me that the criteria should be to pre-empt or possibly deny the information given by the Americans: it then must be possible to immediately announce the execution of a shot, to specify that the dissemination of radioactive products went according to our previsions and hence without danger to the population; it is necessary to contradict immediately, or astutely reduce to its just proportion, partial American information."[149]

The quote is worth being given in full because it echoes another statement regarding upcoming British tests, issued in 1956 by Australian authorities. It specified the public declaration to be made in the hours after the test. Around 3pm on the test's day, the following quote was to be released:

> "Since the test took place earlier today scientific investigations have been proceeding and the results are being checked. The explosion proceeded to plan and aircraft are at present checking the movement of the cloud which has been exactly as predicted."

A little later, when the cloud should be 500 to 800 miles away:

> "The present situation is that all the dangerous contaminated material has either decayed or been safety [sic] deposited as expected. The residue has been mixed with thousands of tons of upper atmosphere and is now no more than a drift of completely harmless material with an insignificant radioactive content."[150]

This narrative highlights the logic behind dark secrecy. State officials had a narrative and a self-image to protect, which implied convincing the public that tests were necessary, but also perfectly safe for nearby populations.

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149 Centre d'expérimentation du Pacifique, Fiche n°2, Politique d'information, DAM/SDE, S7506783, CEA/DAM.
150 Teleprinter message from the secretary to Minister Beale, ministry of supply, AA(ACT): A6456/3; R94/11, cited in full in Cross, *Fallout*, 52.

ii. Data of the state: external overseers' dependence on state discourse

The problem of articulating this narrative on the requirements of strategic secrecy appeared to British officials, who noted that: "it will not be easy to avoid disclosing valuable information to the world and at the same time to convince the Australian public that there will be no fall-out of contamination endangering people or stock".[151] How to rationalize fallout, without revealing too much about how the bombs are made? This highlights the intertwined logics of strategic and dark secrecy. I would argue, however, that it was not necessarily difficult to "avoid disclosing valuable information" and achieve public relations goals, precisely because the public was entirely dependent on state officials for information.

Take the main source of external oversight in a democratic space: journalists. Secrecy basically prevented them from reporting. Historian Elizabeth Tynan argues that the D-notice system, put in place to keep secrecy around nuclear test sites activities, "proved effective in getting the media to respond only to officially vetted information and dissuaded them from seeking other sources for their stories".[152] It was not the only factor, of course. For Tynan, Australian journalists' lack of familiarity with science in public affairs, as much as the D-notice, explains why they "failed to report and interpret the test series" in a manner "befitting their importance".[153] The D-notice system was not foolproof: many exchanges inside the British administration bear testimony to democratic rulers' inability to fully control the press – and their acceptance that it was the rule of the game. Much to the chagrin of UK officials, Chapman Pincher could simply "not be controlled".[154] They particularly resented Australian journalists' practice of "kite-flying", which consisted in publishing certain allegations in the hope of seeing them confirmed by state officials' reactions.[155] Yet, if the implementation of D-notice did not render reporting entirely impossible, it did make it particularly difficult. The possibility of external control over tests was

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[151] Draft "Publicity on Atomic Weapon Trials in Australia. - Joint Paper by M.O.S and A.E.A", undated, AVIA 65/817, TNA.
[152] Tynan, "Atoms and Empty Space. Media and the Most Dangerous Scientific Experiments in Australia," 134.
[153] Elizabeth Tynan, "Maralinga and the Journalists: Covering the Bomb Tests over Generations," *Literature in North Queensland* 38, no. 1 (2011): 131.
[154] Letter from G. Kimber to A.G.R Rouse, 9th February 1956, n°DEF/55/56/30, Confidential, AVIA 65/817, TNA.
[155] Telegram to the UK High Commissioner in Australia, "Edinburgh Airfield", 6th March 1956, n°379, Secret, AVIA 65/817, TNA.

sometimes complicated by "the blanket of secrecy cast over the publication of weather conditions in north-western Australia" during the *Mosaic* series.[156] One struggles to imagine a better way of preventing critics from raising doubts about where the fallout went. All these measures created a situation where the public was dependent on the state for information about state activities.

The French case is remarkably similar. In the Sahara, access to the site's vicinity was strictly controlled. In Polynesia, the possibility existed to simply exclude those who could provide unwanted oversight. 76 out of 77 people forbidden from entering the territory of Polynesia, in 1973, were banned for their opposition to nuclear testing, as was the case for an Australian citizen, who "manifested hostile sentiments toward nuclear experiences". Some were activists, other were doctors, physicians, or journalists.[157] While on the island, the coming and goings of journalists were under close scrutiny. The surveillance power of the French state in Polynesia had been increased by the installation of the CEP. Moreover, data collection controls were implemented, by those same intelligence officers. In December 1968, an American scientist sampled some seaweeds along a Polynesian beach. This information rapidly reached the *Bureau d'Etudes'* chef, who immediately asked the government of Polynesia that "any demand for a mission in French Polynesia by foreign scientists must be communicated to him" to make sure that they did not clash with "security imperatives".[158] An American scientist had already been forbidden to conduct blood sampling in humans and animals in May 1968.[159] A similar case happened in March 1969, when a Czech entomologist was forbidden to go to the Tuamotu Islands.[160] Surveillance of foreign scientists was so heavy that even conference attendees were scrutinized.[161] French scientists were not spared. A research agreement between a research institute in Papeete and Hawaii University

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[156] Cross, *Fallout*, 45.
[157] Liste des étrangers faisant l'objet d'un arrêté d'interdiction d'entrée en Polynésie française, 26th June 1974, 19940219/27, AN. The 77th person being a New Zealander described only as "Extremist. Expert in explosives", which *prima facie* seems a reasonable reason to forbid someone from entering the territory.
[158] Procès-verbal de la réunion du comité de coordination du renseignement du 9 janvier 1969, 10 janvier 1969, 19940390/144, AN.
[159] Procès-verbal de la réunion du comité de coordination du renseignement du 2 mai 1968, 3rd May 1968, 19940390/144, AN.
[160] Procès-verbal de la réunion du comité de coordination du renseignement du 6 mars 1969, 7th March 1969, 19940390/144, AN.
[161] Procès-Verbal du comité de coordination du renseignement du 22 janvier 1969, 23rd January 1969, 19940390/144, AN.

about fish poisoning in the Pacific was perceived as "a way of escaping the efficient control of the government and its services" as "it is not at all improbable that through direct correspondents, foreigners attempt to get samples collected on zones neighboring the ones where our experiments took place".[162] The first foreign mission allowed to collect samples on Moruroa would only be authorize in 1983.[163]

The strict control over the tests' audience created a general dependency on what state officials deemed suitable for public disclosure. The presence of journalists during certain series was not enough of a guarantee: they, too, relied on what communication officers would tell them. Beyond simply seeing the explosion, they could not learn much. The possibility of long-term journalistic investigation, which could have unearthed more about state activities, was made difficult both by the lack of access to the site, and the strict control over its personnel, as well as the development of a surveillance network designed precisely to prevent external actors from gathering more than what state officials wanted to be known. The possibility of challenging the everything-is-under-control narrative was thin. Not only were external controllers excluded from the sites, but the public could also only rely on distorted information.

iii. Covering up blunders: the consequences of absent external oversight

The absence of effective external oversight had one main consequence: when something went wrong, it could easily be covered up, for example with *Gerboise Bleue*, in February 1960. On that day, at the first French nuclear test, the trajectory of the atomic cloud defied all predictions, and left a large cloud "in the shape of a cigar no longer than 300 kilometers long and 30 kilometers wide at most" over the Sahara.[164] Although the nature of contamination following this test is unclear,[165] the blunder was deemed significant enough to justify cover-up. Actual figures of contamination in Algeria would never be published.[166] A report was compiled in 1961, and its publication was recommended by the Foreign

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[162] Note à l'attention du secrétaire general, "Projet de convention entre l'Université d'Hawaï et l'Institut de Recherches Médicales Louis Malardé", 9th May 1969, 19940390/148, AN.
[163] Ministère de la Défense, "La Dimension Radiologique Des Essais Nucléaires Français En Polynésie - A l'épreuve Des Faits" (Ministère de la Défense, 2006), 124.
[164] French report cited in Cooper, "Saharan Fallout."
[165] Generally, the level of radioactivity seems not to have been higher than the defined permissible dose, but on some place, it seems to have – temporarily – exceeded three times this number. Measurements made on some local population after the tests noted no abnormal elevation. Cooper, 213–14.
[166] On the publication of the data gathered in Nigeria, and the conflicts between British and Nigerian scientists, see Mayoux, "Le Soutien Britannique Aux Essais Français Pendant La Décolonisation Africaine (1959-1960): Un Paradoxe." Mayoux argues that Nigerian officials were aware that *Gerboise Bleue* was not harmful to them,

Ministry's Service of Atomic Affairs but it remained classified – and only 10 copies would be distributed to London, Washington and the French delegate at the UN. The figures were considered acceptable, but French officials had grown convinced that: "African observers lacked the expertise needed to understand nuclear contamination."[167] Discussing the problem of fallout with de Gaulle in 1959, Pierre Messmer considered it necessary to be "discreet on this problem" no matter the level of exposure, as African reactions would be "fundamentally different from European reactions" even coming from the more "*évolués*".[168] The presence of fallout monitoring systems in neighboring states provided some sort of oversight, but they could not give a full picture of the contamination, particularly close to test sites.

In Polynesia, similar considerations informed policymakers. The best example is probably *Aldébaran*. The first test at the CEP, in July 1966, *Aldébaran* was not properly controlled. It was the wind's fault. The fallout hit Gambier Island, reaching levels of radioactivity "rarely measured except in graver nuclear accidents" according to physicist Sébastien Philippe.[169] Such a scenario was considered possible by the authorities, who had a solution: the preventive evacuation of the island. Plans for such an evacuation were designed as early as 1963, although the local population was not informed.[170] On the day of *Aldébaran*, they were not informed either. Although the army knew the cloud would hit the island several hours in advance, it made the decision not to evacuate.[171] General Thiry had also decided not to build a protective shelter on the island, against the recommendation of the Testing Site Safety commission. This was largely because shelters, like evacuation, were perceived as anxiety-inducing, and anxiety was understood by French officials as a risk: it could challenge nuclear testing in the Pacific, and even the French presence in the region itself.[172] When, after the first shot, it was confirmed that the population of the Gambier was contaminated, the decision to cover it up was quickly taken. A physician in charge of biological surveillance rapidly drew two conclusions while visiting the island after the test.

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but feared a cumulative effects if French officials kept testing. British scientists, improbable allies for the French government, defended that these tests were innocuous.

[167] Cooper, "Saharan Fallout," 209–11.

[168] Pierre Messmer, cited in Cooper, 210.

[169] Philippe and Statius, *Toxique*, 31.

[170] Fiche sur l'organisation du Centre d'expérimentations de Polynésie, 4th October 1963, Secret, 19940390/45, AN.

[171] Philippe and Statius, *Toxique*, 31.

[172] Meltz, "Sous Le Signe Du Secret," 215.

First, secrecy had to be reinforced, as the figures of the island's contamination would lead people to realize that "something has been concealed to them from the first shot on" and lose trust. Second, he urged authorities to "definitely move away from the island" the couple of "European school teachers" – potential overseers.[173] The incident would not go unnoticed among the local population, but the "correct interpretation" of *Aldébaran* fallout was "reserved to security services and superior officers".[174] Dark secrets had to be kept. The high level of contamination over the Gambier was known in high places, though. On the 24th of August, the General Administrator of the CEA informed the Minister for Spatial and Atomic Affairs, Alain Peyrefitte – a close collaborator of de Gaulle's – that contamination had reached "three times the authorized limits". No measures were taken.[175] The same scenario repeated in 1974 with the *Centaure* shot, whose cloud passed over Tahiti and exposed more than 100.000 people to a dose high enough to entitle them legal compensation. This time, officials had 42 hours to react, but did not.[176]

Although incidents of this scale do not seem to have happened in Australia, covering up blunders was also not uncommon there. The infamous 1957 "Pom-Pom incident", for instance, saw an Aboriginal family, the Milpuddies, found wandering around a highly radioactive test crater at Maralinga. Once identified, the incident was kept secret for fear that controversies around test safety jeopardized the *Buffalo* series. The Australian Royal Commission notes that the officer in charge "went to considerable lengths to keep the story secret", informing every person on the range that the incident was not to be mentioned and that doing so would lead to prosecution under the 1952 *Defence Special Undertakings Act*. The incident was only cryptically mentioned in the officer's report, which was nevertheless classified as Secret Atomic Guard.[177] The Milpuddies were told that "they had accidentally seen something of a Whiteman's ceremony, and they should not declare anything to other white men."[178] 25-

[173] Rapport de mission de La Coquille aux Gambiers du 2 au 10 juillet 1966, GR 13 R 154, SHD.
[174] Meltz, "Sous Le Signe Du Secret," 231.
[175] Compte-rendu de l'audience accordée par le Ministre à M. l'administrateur générale le 24 août 1966, 16h, 30th August 1966, 20110033/6, AN, 2.
[176] Philippe, Schoenberger, and Ahmed, "Radiation Exposures and Compensation of Victims of French Atmospheric Nuclear Tests in Polynesia."
[177] This would be the highest level of classification, "Guard" meaning that the existence of the document itself was to be kept secret.
[178] "Report from the Royal Commission. Vol. I," 321–22.

year-old Eddie Milpuddie was pregnant at the time of the incident. Her baby was stillborn. A few years later, she gave birth to a son, only to see him die of brain tumor at the age of two. Her next child lived but was born very premature. The absence of medical follow-up makes it impossible to establish a causal link between those events.[179] Similarly, when the *Kite* test took place at Maralinga in October 1956, a change in the wind direction blew the cloud toward Adelaide, a fact that was concealed from the public.[180] Again, British dark secrets were the objects of peculiar control.

So far, it is clear that French and British state officials were particularly concerned about their dark secrets and sullied several modes of democratic control to keep them. Deliberation took place based on distorted information, and the public was excluded from oversight mechanisms. However, an absence of external oversight does not necessarily imply a *total* absence of democratic control. Internal oversight, on which state officials insisted, existed. The fact that events such as *Aldébaran* or the PomPom incident happened, and remained secret for decades, suggests these mechanisms were not effective. A closer look at their functioning only confirms that first impression.

b. A lagging oversight: the AWTSC, the SCPRI, and bureaucratic secrecy

The narrative aiming to rationalize fallout production insisted that oversight institutions existed and ensured the safety of tests. It was true. The problem, however, was not that oversight institutions were absent; it was that they could not provide effective oversight. Effective oversight depends on two main conditions: proper access to necessary information, and independence from the overseen actors. Neither condition was met by the oversight institutions created for the occasion. In both cases, the deliberations of these control mechanisms were largely secret: whatever the defined safety conditions were, the basis for these decisions were not available for public scrutiny. In both case, those that were independent did not know enough, and those who knew were not independent. Ernest Titterton, who deceived the Australian prime minister, and Louis Bugnard who cultivated links with the CEA while posing as an

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179 Roger Cross, "British Nuclear Tests and the Indigenous People of Australia," in *The British Nuclear Weapons Programme, 1952-2002*, ed. Douglas Holdstock and Frank Barnaby (London: Routledge, 2002), 85–86.
180 Cross, *Fallout*, 68, 161–64. There are debates about the actual trajectory of the cloud. Lorna Arnold, who argues that the cloud did not pass over Adelaide, nevertheless notes that there was a "marked increase in radioactivity" over Adelaide in the days after *Kite*. Arnold and Smith, *Britain, Australia and the Bomb*, 167.

independent controller are examples of this. They were "shills". As presented before, Goffmann defines a shill as "someone who acts as though he were an ordinary member of the audience but is in fact in league with the performers".[181] It is, simply put, someone who pretends to be on the public's side but who actually defends the interests of state officials. The stories of the Australian AWTSC's and the French SCPRI's effects on the limits of public knowledge are remarkable not only because they confirm the limits of internal oversights posed by strategic secrecy, but also because they are remarkably similar.

i. *Australian oversight and the "Titterton factor"*

I have mentioned earlier the presence of Australian observers at nuclear tests. Their presence evolved in three main phases. First, during the *Hurricane* series, three observers were present in an improvised capacity. Second, for the *Totem* series, an *ad hoc* panel had been created to provide some Australian control over safety conditions. Third, at Maralinga, this panel became a standing committee, the Atomic Weapons Test Safety Committee, with greater access to information. The purpose of this committee was twofold: to ensure the safety of testing on Australian ground and to gather information about nuclear weapons technology for Australian purposes.

The committees' oversight ability has been analyzed in depth by the Royal Commission, and later by historians. At Monte-Bello, two scientists attended the test on Australia's behalf, Martin and Butement, and they "were not in possession of sufficient information to judge whether the firing would cause danger to Australian life or property", lacking key data about the weapon design and the meteorological patterns.[182] Their presence was conditioned on the fact that they would not access "efficiency data".[183] Although British scientists gave their assurance that the tests would be safe, the report on which this assurance was based seem not to have been given to Australia at that time.[184] A third man, Ernest Titterton, had access to more data. For the *Totem* series, a special committee was created. The so-called TOTEX Panel remained under British control, with a Royal Air Force officer at its head. It provided Australians scientists only with "basic information", although more than at Monte-Bello as they were

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[181] Goffman, *The Presentation of Self in Everyday Life*, 146.
[182] "Report from the Royal Commission. Vol. I," 107.
[183] "Report from the Royal Commission. Vol. II," 453–57; 464.
[184] "Report from the Royal Commission. Vol. I," 110; "Report from the Royal Commission. Vol. II," 453.

given "the approximate yield of the weapons" and "the opportunity to witness the bursts".[185] They were not, however, given access to the A32 report, in which meteorologists outlined the conditions under which devices could be fired safely. They therefore had no way of knowing that "the predictions contained in A32 were based on a range of inaccurate assumptions intended to manage risk, but which instead greatly added to it".[186] They could also not know that the *Totem 1* shot was fired under conditions deemed unsuitable even according to those incorrect assumptions.[187]

Again, the idea was not purely to keep dark secrets away from Australian scientists. The US factor must be accounted for. British actors did not know what they could say to Australian officials. First, they were unsure of what existing agreements with the US allowed and forbade them to say. Second, they had a clear incentive to say as little as possible as they were desperate to convince the United States they were a worthy nuclear ally – which meant being able to keep nuclear secrets.[188] Moreover, the British did not fully trust Australian security. As written by Margaret Gowing, after the rupture of nuclear cooperation, "if Britain was known to be engaged in far-reaching discussions with the Dominions, envisaging the automatic sharing of any information received from American sources, this would finally wreck any possibility of atomic agreement with the United States".[189] Hence the reluctance to engage in information sharing. This would change after the creation of Maralinga, and the establishment of a standing committee.

After 1954, a standing committee, with the power to veto tests, was created at the Australians' insistence. The Atomic Weapon Test Safety Committee had access to much more data about tests than before, including meteorological data, fallout pattern, and information about planned yield. It even got partial information about the composition of the weapon. The composition of this committee, as much as the information in its possession mattered, because it shows a clear exclusion of potential critics. An example is Mark Oliphant. A former member of the Manhattan project, Oliphant was not only

185 "Report from the Royal Commission. Vol. II," 466.
186 Tynan, *The Secret of Emu Field*, 146.
187 "Report from the Royal Commission. Vol. I," 150.
188 See chapter 3, section 2, b.
189 Gowing, *Independence and Deterrence. Vol I.*, 174.

Australia's leading physicist, but also a moderate nuclear critic. He had been in trouble with the FBI during his time at the Manhattan project for sharing with the British a piece of information that had worried him: the consequences of radioactive fallout.[190] Subsequently, he was refused a visa for the United States based on an accusation of communist subversion – a surprising accusation considering Groves himself advocated for Oliphant, despite his nationality. For this reason, the British saw him a security risk, and did not want to invite him for fear of American wrath from the very beginning.[191] Had he been invited, it is far from certain he would have accepted. What is clear was that he was convinced that only "a few – a very few – nuclear explosions" were necessary and that "the remainder are completely unjustified except as gestures and as fun for the boys."[192] Absent, too, was any biologist, biochemist, or physician. The Safety Committee was essentially composed of physicists or chemists, and yet was supposed to assess health risks.

Present, however, were scientists from the Australian Ministry of Supply, particularly Alan Butement and Leslie Martin, who were not unhappy about the tests. It was a form of security cooperation which could prove useful for Australia's own nuclear ambitions. Moreover, it ensured a continuous cooperation in the field of uranium extraction, a valuable commercial interest for Australia. None of the Committee's members was particularly independent, nor willing to truly oppose testing. This was made evident, for example, with the case of Hedley Marston. A biochemist working on monitoring the tests, he raised the alarm after the *Buffalo* series, warning of rising radioactivity in the mainland. He was an outsider to the commission, who had to work discreetly as his colleagues kept trying to prevent him from retrieving samples.[193] His results and claims were not brought to Menzies, who instead was told by the Committee that nothing had gone wrong. Later, members of the committee tried to pressure the *Australian Journal of Biological Science*, where Marston published his results, not to issue his paper. When this failed, they then tried to force the journal to publish their response, even though the editors had refused on scientific

[190] Cross, *Fallout*, 54–55.
[191] Arnold and Smith, *Britain, Australia and the Bomb*, 26–27.
[192] Cross, *Fallout*, 48–49.
[193] Cross, 70.

grounds.[194] So, while the AWTSC *could* provide a form of oversight, it *would* not, as it had a vested interest in the tests' continuation.

Oliphant was harsh about the behavior of AWTSC members, particularly its head from 1955 to 1957, Martin. For him, it was "very difficult to believe that [Martin] is lacking in integrity". He would rather 'believe him to be grossly incompetent.'"[195] It seems possible, however, that Martin was sometimes kept in the dark by one of his colleagues. Indeed, when pressed by Hedley Marson about the results of *Kite*, the test whose cloud flew possibly over Adelaide, Martin gave this answer: "No reports re the 3rd Ex have been submitted to me – I left this baby to Titterton. It was a very small one."[196] Titterton was, without a doubt, the most important member of the committee, and became its head after 1957. The Titterton factor in itself, was perhaps enough to ensure lagging oversight due to his strong links with the British.

Titterton, indeed, was not one to be trusted when it came to passing information on to his Australian colleagues. As Tynan writes, "Titterton's role at Maralinga was to be the AWRE man on the ground, and thereby to limit the information provided to the Australian Government."[197] This is not a gratuitous accusation. When auditioned by the members of the Royal Commission, he willingly admitted that he did not convey everything the British told him to his Australian colleagues – "Of course not".[198] The commission, and subsequent Australian historiography sketched a bleak portrait of the man, dubbed the "Australian Doctor Strangelove", who would have done anything for the UK – his real country since, as Tynan insists, he was not really Australian and "loyal to Britain".[199] A more nuanced approach to the character complexifies this portrait. As a former member of the Manhattan project (he was the one who pushed Trinity's button), he also was bound to secrecy on many topics.[200] But, as Jessica Urwin argued

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194 Cross, 167.
195 Cross, 71.
196 Cross, 78.
197 Tynan, *Atomic Thunder*, 154.
198 Royal Commission into British Nuclear Tests in Australia, Transcripts of the Proceedings, 15 May 1985, 7779a, A6448, vol.14, NAA
199 Tynan, *The Secret of Emu Field*, 44.
200 It is, at least, how he justified his behavior in front of the Royal Commission. See Tynan, 44, fn. 193.

recently, over all else he was loyal to a nuclear future. His vision of the promises of nuclear energy justified downplaying risks related to nuclear tests.[201]

From the beginning, Titterton was entrusted with much more information than other Australian scientists – even when he was not the head of the AWTC. In fact, he was the one who defined the criteria for Australian access to nuclear data during the *Totem* series. Regarding category C personnel, who could have access to full information, he considered himself the "only individual in the Commonwealth with the necessary clearance and experience" to belong to it.[202] During his career, he willingly kept details to himself. For example, he concealed, at the request of the British, the use of cobalt-60, a highly radioactive isotope, as a tracer during the *Antler* series[203] and misled the Prime Minister into believing that the *Totem* series presented much fewer risks than it actually did.[204] He also tried his utmost to frustrate the publication of Hedley Marston's findings about the presence of radioactive iodine in Australian sheep's thyroids.[205] He most definitely acted as a "shill". Rather than informing his audience, he served the interests of the "performers" – British nuclear officials – by selectively informing his peers. His presence, in itself, was enough to prevent the possibility of effective Australian oversight. It was no mere chance; British officials had selected him for this reason, a man they could trust.[206]

First deprived of access to the necessary information, then represented by those with vested interests in the tests' continuation and infiltrated by a "shill", Australian oversight mechanisms were simply not up to the task. They were structurally unable to provide proper oversight, lacking both adequate knowledge and independence. When testing in the Pacific, oversight was ensured internally inside the *Grapple* Task Force, constituted essentially of actors from either the AWRE or the Military, without any sort of

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201 Jessica Urwin, "The British Empire's Dr Strangelove? Ernest Titterton and the Royal Commission into British Nuclear Tests in Australia," *History Australia*, November 23, 2021, 1–23.
202 Cited in Tynan, *The Secret of Emu Field*, 45.
203 Members of the AWTSC were not informed of the presence of this product, and it was discovered when a routine watch stumbled upon pellets which activated its Geiger counter. See "Report from the Royal Commission. Vol. I," 388–93.
204 He assured the Prime Minister that it was "impossible" that the series caused any harm. When auditioned by the Royal Commission, he commented that he assumed that the Prime Minister "would understand that the word, impossible, does not mean impossible". "Report from the Royal Commission. Vol. II," 467–68.
205 See Cross, *Fallout*. notably chapter 10, which narrates the (very) long story of the findings' publication.
206 Tynan, *Atomic Thunder*, 160–61.

independent actor.[207] In this sense, the British experience was surprisingly comparable to the French one.

ii. <u>Bureaucratic competition in the French state: the exclusion of independent controllers, and the rise of self-controlled nuclear officials</u>

French atmospheric tests took place on national territories. Very few mechanisms allowed, generally speaking, to control the CEA and the military. The existing structure, the *Service Central de Protection contre les Radiations Ionisantes* (SCPRI, Central Service for Protection against ionizing radiation) faced two limits. First, secrecy limited what it could know about nuclear activities. Second, a French shill, Louis Bugnard, limited what it could do. Soon enough, the SCPRI would disappear from the scene: in 1964, the CEA and the military created their own internal service, effectively burying the possibility of independent oversight. For most of the duration of atmospheric testing, no independent oversight existed.

Things had started differently. In 1958, Colonel Ailleret had requested an oversight institution be created, resulting in the Consultative Committee for Test Site Safety. Cognizant that military personnel had a different perception of risk than civilians, he persuaded the government to create a Commission which could advise about the safety provisions of nuclear tests in Algeria. He, nevertheless, requested that more military officers than physicists or doctors be part of the commission.[208] Only one member, Louis Bugnard, was not a member of the CEA or the military, which severely limited the possibility of *external* oversight. Before tests took place, head of the Committee Francis Perrin argued for a large transparency about the results of fallout measurements over the Sahara, to back up French assertions about the innocuity of their tests.[209] The committee particularly recommended working with the Public Health authorities in a bid to increase the independence and hence the legitimacy of the published data.

The Minister of Health happily agreed with the proposal. Not only would it show good faith to an international audience, but it also gave his service the opportunity to begin an association with the CEA

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[207] Maclellan, *Grappling with the Bomb*, 105–23.
[208] Meltz, "Pourquoi La Polynésie ?," 50.
[209] Ministère de la Défense, "Rapport Sur Les Essais Nucléaires Français (1960-1996).," 87.

which could "solve in the best possible ways the acute problems now posed by the functioning of existing atomic center (…) on the metropolitan soil".[210] French public health authorities were not only concerned about the health of the Saharan population, but with CEA activities in France more generally. A note written by a member of the Ministry of Health cabinet, ironically dated from the 13th of February 1960, made the inventory of the CEA's security flaws, and argued that the absence of a major incident so far was "partly due to luck, partly due to the precautions taken". For years now, the CEA had released radioactive products, potentially harming the civilian population, using secrecy as a shield against scrutiny.[211] It effectively functioned as its own judge, preventing the production of independent data.

The Ministry of Health and Populations had created the SCPRI in 1957, to produce its own data and assessments about radioactivity in France. The organization's mandate was rather large, from assessing the safety of the Marcoule installation to checking radon levels in mineral water. It was headed by Pierre Pellerin, a physician, but under the authority of Louis Bugnard, who led the Institut National d'Hygiène. Bugnard was the only "external" actor member of the Test Site Safety Commission. Bugnard rendered any independence the commission might have enjoyed null. For he, like Titterton, was a "shill". He was close to the CEA, and particularly to the head of its radioprotection service, Henri Jammet. Bugnard was described by Jean Charbonnel as "eager not to do anything that would bother the CEA, where he entertains many friendships".[212] He went on to become the director for Biology and Health at the CEA in 1964.[213] In the meantime, he served as the representative for the Ministry of Health on numerous committees, including those related to "radiation protection regarding military activities and national defense" and the Site Safety commission.[214] A busy man, he frequently sent an auxiliary to replace him.

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[210] Draft letter from the Minister of Health to the Minister of Armies, undated, CHA57, CHSP.
[211] Note à l'attention de Monsieur le Ministre sur les problèmes de santé posés par les rayonnements ionisants, 13th February 1960, CHA57, CHSP. Such incidents, although jaw-dropping from today's perspective, should not come as a surprise in the historical context. As Cyrille Foasso has shown, before 1960s, security regulations in CEA sites were extremely primitive: "from 1945 to 1959, no doctrine ruled over the safety of atomic installations in France". Cyrille Foasso, *Atomes Sous Surveillance. Une Histoire de La Sûreté Nucléaire En France* (Bruxelles ; New York: Peter Lang, 2012), 55.
[212] Note "Sur les problèmes actuels du SCPRI", 9th May 1960, CHA57, CHSP.
[213] Organigramme du CEA, 1964, CHA29, CHSP.
[214] Note "Différentes instances auprès desquelles le SCPRI doit représenter officiellement la Santé Publique", February 1964, 19760161/009, AN.

His auxiliary was none other than Henri Jammet from the CEA.[215] It must be underlined that Bugnard was not the only person responsible for the CEA's dominance over the radioprotection regime. Numerous reports from the Ministry of Health indicate those issues were endemic, and created a *de facto* situation were "the CEA exert its tutelage over all the Ministries interested in the problems posed by ionizing radiations, even though it is judge and party in this domain".[216]

In this context, the SCPRI would nevertheless be sent to Reggane in 1960 to ensure the measurement of independent data about fallout. Their contribution to the monitoring of *Gerboise Bleue* was minimal: unable to actually measure data, they "served only as an outward-facing support". The CEA frowned at this threat to its monopoly. Bugnard rapidly decried the decision to send the SCPRI to Reggane as a "waste of public funds".[217] The experience would not be reconducted: for the second series of testing, the Ministry of Health would only be informed about *Gerboise Rouge* at the last minute, and the SCPRI would not be allowed to attend the explosion.[218] It was up to the CEA and the Armies themselves to inform the public about radiation. The CEA truly was the only sheriff in town: not only was the SCPRI out of the picture, they also "monopolized French fallout monitoring in Algeria and African territories belonging to the French Community".[219] The SCPRI exclusion from the oversight of nuclear testing was definitive in 1964, when the *Service Mixte de Sécurité Radiologique* (SMSR, Mixed Service for Radiological Safety) was created. A joint service between the CEA and the Military, the SMSR was in charge of measurements, analysis and assessments of the radiological consequences of the test. It was now official that there would be only one actor to produce data about nuclear testing, and that this actor

[215] Note "Sur les problèmes actuels du SCPRI", *op. cit.* 4.
[216] Note à l'attention du Ministre de la Santé, "Révision du décret n°58-344 du 3 avril 1958", 28th July 1966, 19760161/009, AN. The problem was, in fact, raised as soon as 1964, but Gaston Palewski, minister for Atomic Affairs, refused to act upon this situation. Letter from Gaston Palewski to the Minister of Health, "Protection contre les rayonnements ionisants", 29th May 1964, n°64-5678, 19760161/009, AN.
[217] Note "Sur les problèmes actuels du SCPRI", *op. cit.*
[218] Handwritten notes, "Participation du SCPRI aux Tests Nucléaires du Sahara", 31st december 1960, CHA57, CHSP – The notes are not undersigned, but it is possible to recognize Pierre Pellerrin's handwriting.
[219] Cooper, "Saharan Fallout," 204.

would be under the control of stakeholders.[220] The SCPRI attempted to extend its radiation surveillance network to Moruroa in 1966, but there exists no evidence that it took place.[221]

It would be imprecise to state that France operated without any sort of external oversight while testing in the Pacific. Neighboring countries, Australia and New Zealand, repeatedly asked to be informed about the safety provisions. There demands were eventually met and although they would not be told about the kind of weapons, or the planned yields of tests, information was given about safety provisions, and satisfied the scientists sent in this purpose. Perhaps it is useful to mention that the scientist sent by Australia was none other than Professor Ernest Titterton.[222]

External oversight mechanisms were prevented from exercising proper control and left state actors with considerable autonomy. Internal oversight suffered from similar flaws although, as much as secrecy, the absence of independence was a particularly important one. Once again, secrecy excluded potential critics, and distorted the narrative given by shills to the audience. Consequently, oversight mechanisms were built in such way that critics would be kept away, and that those entrusted with the necessary data would opportunely not be actors who could spill the beans about the state's dark secrets. It must be noted, however, that these efforts to keep dark secrets were not purely instrumental: they stemmed from the process of audience selection designed to differentiate between those who could acquire strategic secrets, and those who could not.

c. Lack of accountability: secrecy and the production of invisibility

This section focuses on the very possibility of accountability, that is, the possibility of knowing about nuclear testing. In it, I argue that, even if all documents were made available, data collected at the time might prove insufficient to exert proper control, even a posteriori. The absence of oversight is a deep flaw for effective democratic control. The question of the possibility of accountability remains to be

[220] It was created unofficially at the occasion of the *Turquoise* shot, in November 1964. Ministère de la Défense, "Rapport Sur Les Essais Nucléaires Français (1960-1996).," 173.
[221] Note pour le Chef du SCPRI, "Contrôle de la radioactive (*sic*) ambiante en Polynésie Française", 10th August 1966, n°DGSP/HP/4ème/Rad683, 19760161/009, AN.
[222] Sarah Mohamed-Gaillard, *L'archipel de La Puissance? La Politique de La France Dans Le Pacifique Sud de 1946 à 1998*, (Bruxelles: Peter Lang, 2010), 314.

solved. If control was impossible before, and during, the tests themselves, how much accountability was possible afterward? Accountability depends essentially on data availability. Only a limited number of actors had access to data, as they were kept secret, and as a monopoly over data production was established by actors. Moreover, when accident happened and harm caused, actors covered things up, hence escaping accountability at the time. To ask for reparation for the damages done, one must know about those damage.

Accountability supposes the existence of evidence. But what does evidence mean? No one can *see* radioactivity *per se*. Because radioactivity cannot be seen, its social existence depends on the presence of similar systems, composed of epistemic actors (physicists, biologists, physicians…), modes of measurements, and of an understanding of their effects on human beings. If no one is there to measure radioactivity, it is socially absent – although, materially, it may very well be present.[223] Olga Kuchinskaya, in a study of radioactivity in post-Chernobyl (and post-Soviet) Belarus, shows how secrecy over the nuclear accident's health effects was maintained not solely through classification but also through state efforts to structure the collection of data and production of data in such way that reality would remain invisible. Consequently, "the problem is not just with a potential underestimation of the affected populations but also with compromised or nonexistent conditions for data collection and analysis".[224] These *politics of invisibility*, as she names them, were at work on nuclear test sites. To put it simply, if there were no measurements of radioactivity on certain sites or population, radioactive contamination might have existed, but accountability for it would be impossible.

I will start with one example. In his history of state conquest over nature in the Australian's South, William J. Lines writes about the consequences of nuclear testing on Aboriginal people that "many died

[223] This argument is inspired by Latour's argument about Pasteur. In *The Pasteurization of France*, Latour argues that Louis Pasteur and the pasteurians were not simply physicians, but also sorts of "sociologists", because their masterstroke was not the discovery of microbes strictly speaking, but how they "redefined the social link by including the action of the microbes in it". Microbes existed, in a material sense, before their discovery in the 1870s. But their *social* existence depended on the hygienists movement of the late XIXth century which made them *exists* in the eyes of social actors – who, to the exception of few people working in laboratories, could still not see them. In other words, their social existence depended on the presence of a socio-scientifical-technical system composed, among other things, of physicians, microscopes, and Pasteurian science. Bruno Latour, *The Pasteurization of France* (Cambridge, Mass: Harvard University Press, 1988).
[224] Olga Kuchinskaya, *The Politics of Invisibility: Public Knowledge about Radiation Health Effects after Chernobyl* (Cambridge, Massachusetts: The MIT Press, 2014), 161.

within a few hours or weeks, other became blind and many, many more contracted cancer".[225] This statement, in any scientific sense, is incorrect.[226] It is a type A error: although there is no actual evidence to support that these are facts, Lines assumes them to be true. However, it may be hasty to say that it is *false*. This would be committing a type B error: in the absence of evidence for fact X, one concludes that it is false, rather than considering the possibility that the flaws lie in data selection. The truest statement to be made would be that there is no evidence other than circumstantial which can lead to this conclusion, but that the absence of evidence does not equate to an evidence of absence, *particularly when evidence has been tampered with*.

How many Aboriginal people were, indeed, affected by nuclear testing in Australia is unknown. It is unknown, simply because British officials did not gather appropriate data about aboriginal presence in the vicinity of the sites. They reported, for example, that only 715 people lived in the area, excluding Aboriginal people "for whom no statistics were available". But statistics *were* in fact available and would have informed them that 4538 Aboriginal people likely lived in the region.[227] During the entire Australian testing experience, Australian and British authorities rejected and ignored reports from Officer MacDougall, a ranger in charge of monitoring Aboriginal populations in the bush. He was accused of "placing the affairs of a handful of natives above those of the British Commonwealth of nations".[228] Aboriginal people's presence around the test sites *could* have been spotted but, really, there was no real efforts to know.

Rather, British officials used their own imagination to fill in the blanks of fallout estimate, originally forgetting elements, such as the fact that Aboriginal people were usually largely naked and did not wear footwears – conditions which were likely aggravate exposure to fallout. Their ignorance of Aboriginal people life was such that officers in charge of patrolling the fields to prevent their presence in the forbidden zone operated from the assumptions that they slept most of the day. Consequently, a single

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225 William J. Lines, *Taming the Great South Land: A History of the Conquest of Nature in Australia* (Athens, Georgia: University of Georgia Press, 1999), 214.
226 Claims of corpses lying around test sites, or being buried by servicemen have been made, but all were rejected by the McLelland Commission and the historiography.
227 "Report from the Royal Commission. Vol. I," 118–20.
228 "Report from the Royal Commission. Vol. I," 308–9.

search day would have sufficed to remove them all. However, Aboriginal people do not sleep for most of the day – few adult human beings do.[229] As a consequence, it is possible – and one must insist on the possible, as no evidence has emerged – that Aboriginal people were present inside the forbidden zone at the moment of a test.[230] After all, there is evidence that the Milpuddies camped next to a nuclear crater.

Similar absence of evidence is notable, too, with regards to nomadic population of the Sahara. Although some measurements were made about them, their exact number, their position at the moment of the test and the extent of their exposition to radioactive fallout remains unknown.[231] Although French officials estimated that this population was almost non-existent, an ethnologist at the time emitted doubts based on her thorough knowledge of the region, and estimated it to be inhabited by 200.000 people.[232] But, as for the Aboriginal people, there was no real will to know. This "will not to know" is in fact quite representative of the colonial experience. In colonial situation, the state sometimes "consciously chose not to gather the most basic information" about its population.[233] It must be noted that those absences are not uniquely colonial: military personnel, both those involved in the British and in the French test, recount that their dosimetric badges were rarely useful – either because they were thrown away, not retrieved or because they have never been told what the results actually meant. Similarly, many complained that their medical files were incomplete, or absent.[234]

Fallout measurement did not always work perfectly, either. British measurements, for example, were based on sticky papers, a method later described as "totally inadequate", notably because heavy rain made them totally inefficient.[235] In one case, they ended up being useless, as the peak fallout happened

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[229] Cross, "British Nuclear Tests and the Indigenous People of Australia," 84.
[230] This is the hypothesis of Heather Goodall, Australian historian specialist of the history of Aboriginal people in Australia. Cited in Tynan, *The Secret of Emu Field*, 160–61.
[231] This was particularly true after *Gerboise bleue.* Cooper, "Saharan Fallout," 213.
[232] Christopher Robert Hill, "Britain, West Africa and 'The New Nuclear Imperialism': Decolonisation and Development during French Tests," *Contemporary British History* 33, no. 2 (April 3, 2019): 280.
[233] Keith Breckenridge, *Biometric State: The Global Politics of Identification and Surveillance in South Africa, 1850 to the Present* (New York: Cambridge University Press, 2014), 117. Thanks to Ronan Jacquin for introducing me to this "anti-foucaldian" conception.
[234] See, for example, testimonies from participants in Algerian tests in Barrillot, *Les irradiés de la république*, 30, 34, 36, 39, 74, 76, 79, 83, 96.
[235] "Report from the Royal Commission. Vol. I," 248.

between two stations and was not recorded. Moreover, for the first two series of tests, there existed no systematic monitoring. For *Hurricane*, no radioactivity monitoring on the mainland was done, because scientists did not expect to find any. Samples from the roofs of habitations on the mainland would contradict those hopes. If it is assumed that most radioactivity went out at sea, it is in fact impossible to know how much fallout fell on the mainland.[236] Regarding the possibility of internal contamination, "there were no measurements for increased radioactivity in food products subsequent to the tests in any series", as noted in an Australian report from 1992 attempting to reconstruct doses.[237] Although French scientists were more meticulous, proceeding to sampling on food and milk, measurements suffered from some flaws as well. Post-test reports show many cases where filters did not function properly. Regarding exposed population, although some sampling was made on food and drinking water around Moruroa, these cannot tell how much radiation one individual has absorbed internally. Moreover, interdiction for foreign scientists to take sample and produce knowledges about local radioactivity must be added. Knowledge about test effects remains grounded in data built by institutions with vested interests in concealing the dark secret of radioactivity.

Accountability, for all these reasons, is strongly limited. Even if all archives were made available, data would remain limited and could not give the full picture of what happened in Australia, Algeria, or Polynesia as France and the UK were exploding weapons. If oversight was flawed due to the conditions of knowledge distribution, accountability will remain limited due to the conditions of knowledge production. Limited, of course, does not mean that certain actors cannot be held to account. Recent attempts at dose reconstruction, such as the one carried by Sébastien Phillipe, have already provided evidence of previously unknown case of contamination.[238] Total accountability may be unattainable, but that does not have to be the only end goal. Democratic governance can tolerate a certain level of uncertainty. However, it is clear that nuclear secrecy regimes, because they concealed certain data and

[236] "Report from the Royal Commission. Vol. I," 116–17.
[237] Keith N. Wise and John R. Moroney, "Public Health Impact of Fallout from British Nuclear Weapons Tests in Australia, 1952-1957" (Melbourne: Australian Radiation Laboratory, May 1992).
[238] Disclose, "Essais nucléaires : des milliers de nouvelles victimes potentielles en Polynésie," Essais nucléaires : des milliers de nouvelles victimes potentielles en Polynésie - Actualités - Disclose.ngo, May 17, 2022, https://disclose.ngo/fr/article/essais-nucleaires-en-polynesie-des-milliers-de-nouvelles-victimes-potentielles.

precluded the production of others, created a massive lack of accountability in regard to nuclear tests. With a flawed process of deliberation, an impossible external oversight and a lagging internal oversight, this is the last mode of democratic control to be affected by nuclear secrecy.

3. Conclusion

This chapter has focused on how nuclear secrecy regimes affected the possibility of democratic control over atmospheric nuclear testing in France and the UK. It has argued that neither of the conditions for effective deliberation, oversight or accountability were met as a direct consequence of nuclear secrecy. From the very beginning, nuclear test sites were shrouded in secrecy in order to protect a state's "strategic secrets". This allowed state officials to maintain control over what information would reach the public. To keep nuclear secrets – bomb design, yields, testing plans, etc… - secret from the "audience", exceptional regimes of information controls were put in place. Non-authorized audience members were kept away from the sites, strict controls were organized in and around the site and even the tests' exact timing was kept secret to control who could attend it, and who would rely on second-hand information. This, in the end, was a failure: espionage and nuclear forensic analysis allowed many states to spy on these strategic secrets. What remained secret was primarily the extent of radioactive fallout over populations and the environment – the degree of nuclear harm and risk exposure.

Modes of control	United Kingdom	France
Deliberation	**Flawed deliberation process** Absence of deliberation over test site selection (see chap.4) Flawed information about potential risks and control procedures.	**Flawed deliberation processs** Absence of deliberation over test site selection (see chap.4) Flawed information about potential risks and control procedures.
Oversight	**Restricted oversight** <u>External oversight</u>: exclusion of journalists and independent actors. Concealment of accidents and distortion of public narratives (Milpuddies case, *Kite* test) <u>Internal oversight:</u> Presence of a "shill" (Ernest Titterton) and exclusion of potential critics (Marston, Oliphant). State monopoly over data	**Restricted oversight** <u>External oversight</u>: exclusion of journalists and independent actors. Concealment of accidents and distortion of public narratives (*Gerboise Bleue, Aldébaran, Centaure)* <u>Internal oversight:</u> Before 1964, presence of a "shill" (Louis Bugnard) and exclusion of potential critics (Pierre Pellerin). After 1964, exclusion of non-CEA or military actors. State monopoly over data.
Accountability	**Lack of accountability** Flawed practices of data collection, concealment of records	**Lack of accountability** Flawed practices of data collection, concealment of records

Table 5 - Democratic control over nuclear testing - Summary of the findings

The consequence of these secrecy regimes was, first, a flawed process of deliberation where the public was misled about the actual risks. Second, secrecy led to the impossibility of effective external oversight. The kind of data available to an external audience did not allow, in any case, to really know about this. Rumors existed, but actual knowledge of radioactive contamination remained a secret. It remained a secret even to an internal audience. As in the Australian case, where the presence of Ernest Titterton, and the British reluctance to share nuclear data with the Australian, prevented the oversight institutions from functioning properly. In any case, those institutions could only be constituted of members of the selected audience allowed to attend testing, that is, it could only be constituted of actors with a vested interest. This was obvious in the French case where the oversight institutions were composed only of CEA and military personnel, plus Louis Bugnard, the French "shill". Although an independent institution existed, it was maintained away from the site by CEA actors. Regarding accountability, the possibility exists, but only in a limited manner and retrospectively, after the end of the term in office of officials, or even of their lives. While oversight was made impossible due to the condition of knowledge distribution, I have argued that the condition of knowledge production also created barriers to what could be known about the effects of nuclear testing.

A more democratic control of nuclear testing would have been possible. Nothing prevented actors from taking responsibility for fallout, or to present the risks to the public for deliberation. Contrary to what the CEA official historian writes, it is not "the Cold war context" which primarily explains officials decision to retain those data.[239] Though this context had a certain weight over their decision, they also were aware that a large part of their strategic secrets was blown with the wind. What explains their choice to maintain secrecy over dark secrets was the fear of losing face, of admitting their practices of risk exposure, and the fear that it would jeopardize nuclear development. The complex regime of secrecy created to protect strategic secrecy offered all the resources required to maintain secrets over fallout too. Nuclear weapons' security implications gave officials an opportunity for more secrecy, and more autonomy. As for nuclear policymaking, nuclear secrecy regimes limited the ability of the public to

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[239] Dominique Mongin, *Les Essais Nucléaires En Polynésie Française. Pourquoi, Comment et Avec Quelles Conséquences ?* (Paris: Direction des Applications Militaires du CEA, 2022), 109.

exert control over the democratic state's actions. They effectively limited democracy and placed both nuclear policy and their externalities outside the scope of democratically controllable issues. Nuclear weapons did not only hurt people, or the environment. They hurt democracy.

Conclusion: "Democracy" in the nuclear state[1]

Reflecting on a career of writing about the British secret state, Peter Hennessy wrote about the British nuclear debate:

> There is (…) a special ingredient in the UK's rolling debate about the Bomb. It is, as Professor Sir Lawrence Freedman put it in late 2011, 'always about tangibles and intangibles'. The tangibles are all the other things 'you can buy with that money'. The intangibles? What might await us deep in the future. 'It's either completely useless,' said Lawrie Freedman. 'Or one day, it might be the only thing that saves our children and our grandchildren.' I agree very strongly with that – which is why I am a deterrent man.[2]

There are two problems with this claim. The first is that it ignores at least one other intangible: nuclear weapons might equally be the thing that kills our children, if not us, and make the planet unhabitable for our grandchildren. The second problem is that nuclear weapons do not only have financial costs, but also democratic ones. As I have shown in these pages, they restrict democratic government and limit the ability of citizens to govern themselves.

In this conclusion, I discuss the implications of this finding. In the first section, I summarize the dissertation's main claims, highlighting the study's relevance and contribution. In the second section, I briefly discuss how my theoretical framework applies to other nuclear-armed democracies. Then, I explore the limits of my findings by conducting a short counterfactual analysis aimed at showing how different actors' choices could have led to different outcomes. I argue that, had the actors decided to vouch for democracy, the democratic cost of nuclearization would likely have been lower, but not null either. I conclude by discussing the implications of this conclusion and propose pathways for future scholarship.

1. Summary of the findings

In this dissertation, I have sought to determine how the pursuit of nuclear weapons affect the democratic state, in order to make visible certain effects ignored by the existing literature. In the first chapter, I argued that the security implications of nuclear technology were likely to produce structural constraints

[1] In the context of this dissertation, "nuclear state" refers to nuclear *weapons* states.
[2] Peter Hennessy, *Distilling the Frenzy: Writing the History of One's Own Times* (London: Biteback, 2012), chap. 4.

that would lead to the emergence of restricted democracies. Restricted democracies, I maintained, are states that satisfy most of the criteria for democratic government but not all of them. In a restricted democracy, certain parts of the state remain outside of democratic control. Though it is the nature of democracy to remain incomplete, restricted democracy differs from other types of democracy as the restriction put on democratic government are avoidable. They do not stem from the requirements of representative government, but from the requirements of security assumed to be provided by nuclear weapons. Through an analysis of three cases, based on primary sources, I have sought to show how the pursuit of nuclear weapons led to the emergence of a domain of policy beyond democratic control. Through the development of nuclear secrecy regimes, the nuclearization of three European democracies led precisely to the emergence of restricted democracies. As I have shown in the last two chapters, democratic control over nuclear issues was structurally limited in all three states, and these restrictions can be attributed to mechanisms related to the respective states' information control regimes. In other words, nuclear secrecy regimes have restricted the domain of democratically controllable state actions, even before nuclear weapons were produced. This was the case with nuclear policymaking and the effects of nuclear testing.

In the case of nuclear policymaking, mechanisms of exclusion (when secrecy straightforwardly prevents the public from exerting control over certain actions), distortion (when secrecy flaws democratic control by distorting the image of certain actions given to the public), and denial (when secrecy makes it difficult for actors to acknowledge what they know) each hampered the democratic control of nuclear policy in different ways. It gave considerable autonomy to state officials and led parliaments to rubberstamp executive decisions. It allowed officials to escape accountability, both while in office, and long after. In France and the UK, not only was there no deliberation over choices as basic as whether to acquire nuclear weapons, there was no deliberation over planned use for those weapons, that is, over how state officials were ready to exert large scale violence bound to kill numerous civilians and possibly some of their fellow citizens in the name of their citizens. Policy choices related to the development of nuclear forces was better controlled, but the thick layer of secrecy which surrounded anything nuclear made it difficult for MPs and the public to truly know what the state was doing. In fact, it was difficult even for

members of the executive.[3] This implies, incidentally, that the public knew very little about the "tangible costs" of nuclear weapons possession discussed by Hennessy and Freedman. In Sweden, where nuclear weapons never became tangible, secrecy also hampered control, although in a much more limited manner. After a choice to put nuclear acquisition up for deliberation, and subsequently to abandon the nuclear path, secrecy continued to cast its shadow over nuclear policy. Behind a layer of secrecy, some FOA personnel and some in the military continued to pursue nuclear ambitions, unbeknownst to the public. It would, in fact, only be in the early 2000s that the truth would emerge. This means that, even without acquiring nuclear weapons, nuclearization has a tangible cost for democracy. More than this, the hysteretic nature of nuclear secrecy – the fact that it last for decade after the end of the program – shows that these costs can continue even after a state abandons its program. The plausibility probe into other cases of nuclear-armed democracy that I will present in the next section leads to the conclusion that this inference is valid not solely for the three cases studied here but for all nuclear-armed democracies.

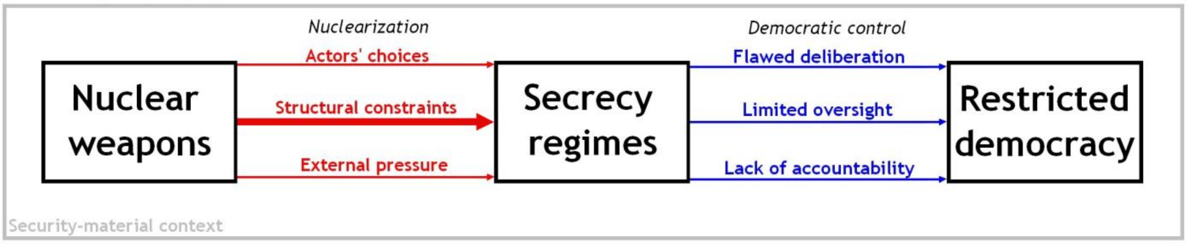
The democratic cost was important too as illustrated by the practice of nuclear testing. In chapter 5, I investigated how nuclear secrecy regimes affected the public's ability to control the negative externalities of nuclear development. Atmospheric nuclear testing, an activity practiced by both the UK and France for some years, led to considerable radioactive fallout. This fallout, in turn, exposed a large number of people to severe health risks, fostering serious harm to individuals and the environment. The strict regimes of secrecy around the relevant test sites, made to protect the strategic secrets of the state, offered the opportunity of concealing those dark secrets too. Conscious that the production of fallout could have cast a dark shadow on them, state officials sought to conceal the risks, harm, and blunders they were responsible for. Because of this, people were exposed to harm, or risk of harm, without deliberation over the opportunity of such tests, the possibility of exerting oversight, or to demand accountability. *The nuclearization of those states restricted democratic government by restricting the*

[3] For example, de Gaulle was deceived about the safety of France's first-generation weapons as discussed in chapter 4. Pompidou, too, was kept in the dark by the CEA over its thermonuclear development. The Australian prime minister was similarly lied to about the consequences of certain tests, as shown in chapter 5.

public's ability to control state actions. More than this, it restricted the public's control over the level of violence their state was ready to exert, both on its own population and on those of other states.

How did this happen? In the first two chapters of the dissertation, I proposed a two-step explanation for the emergence of nuclear secrecy regimes. I argued, first, that the absence of forms of restraints against nuclear violence – i.e an international control regime over atomic energy – left states interested in the pursuit of nuclear weapons with no choice but to resort to secrecy to tame the exceptional vulnerability created by the absolute weapon. Absent an international control regime, secrecy became the solution for security for, and from, nuclear weapons. This implied the continuation of wartime practices of secrecy into peacetime, since, in a nuclear-armed world, war is never far away. The agentic capacity of technology, its ability to participate in social life, created a structural constraint on actors. Second, I showed that these structural constraints were necessary, but insufficient, to explain the historical development of nuclear secrecy regimes. Two other mechanisms must be accounted for: US diplomatic pressure and domestic choices. *This means that, though the emergence of nuclear secrecy regimes was pretty much inevitable, their boundaries were not fixed and could have been minimized*. State officials made the choice to conceal more than they had to, using the requirements of security as an excuse to acquire more autonomy. They exploited the vulnerability created by nuclear weapons to restrict democracy more than necessary in a strict security perspective. The boundaries of secrecy are not fixed, for these precise reasons: the actors' role in determining the external boundaries means that they sometimes change. An example of this change was the switch from "clandestinity" to legality, which came with the revelation of the respective programs' existence to the public. As I have shown in chapter 4, though officials had found an interest in total secrecy before, it started to become a burden as contradictions accumulated, secrecy became more difficult to hold, and as the development of the arsenal required more resources which meant asking Parliament more straightforwardly for funds. For these reasons, officials came clean – a sign that clandestinity was and had always been a choice.

Figure 9 - Summary of the argument



In 1950, political theorist Clinton Rossiter feared that the "absolute weapon" could eventually bring "absolute government" to the United States.[4] This did not happen either in the US or the three democratic states studied in this dissertation.[5] Yet, the pursuit of nuclear weapons was hardly without a democratic cost. Nuclearization transformed the state. Instead of adapting nuclear secrecy to the democratic framework, it rather the democratic state which evolved to accommodate for the requirements of nuclear secrecy and, in doing so, restricted the scope of democratic government. Though neither France, the UK or Sweden could be qualified as non-democratic states, the scope of democratic control in those states remained limited due to internal factors as well. This means that state actions in the domain of nuclear policy – perhaps one of the most important domains of policy – were out of the public's reach.

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[4] Rossiter, "What of Congress in Atomic War?," 602–3.

[5] That it did not happen, however, does not mean that it *could not* have happened, however. Scholarship has shown that the absence of unwanted nuclear explosion during the Cold War was the result not of perfect control over arsenals, but of luck. If one of those explosions had taken place – for example, during the Cuban Missile Crisis – the history of democracy and nuclear weapons in the XXth century would likely have been radically different. On the role of luck as necessary to avoid unwanted nuclear explosions so far in a series of episodes of the nuclear age and its probable underestimation, I refer to Pelopidas, "The Unbearable Lightness of Luck." These findings are now accepted in the literature. See Martin J. Sherwin, *Gambling with Armageddon: Nuclear Roulette from Hiroshima to the Cuban Missile Crisis, 1945-1962* (New York: Alfred A. Knopf, 2020), chap. 3; Vipin Narang and Scott Douglas Sagan, eds., *The Fragile Balance of Terror: Deterrence in the New Nuclear Age* (Ithaca: Cornell University Press, 2022), 2, 231; Michael Bess, *Planet in Peril: Humanity's Four Greatest Challenges and How We Can Overcome Them* (Cambridge: Cambridge University Press, 2022), 13. See also Richard Ned Lebow and Benoit Pelopidas, "Facing Nuclear War. Luck, Learning and the Cuban Missile Crisis," in *Oxford Handbook of the History of International Relations*, ed. Christian Reus-Smit et al. (Oxford: Oxford University Press, 2023).

2. What about other democracies? Probing the argument on other cases

How does my theory hold beyond the three cases studied? In this section, I conduct a plausibility probe on three other nuclear-armed democracies: the United States, India, and Israel.[6] I also briefly consider the case of democratic states hosting nuclear weapons. The purpose of this section is to show how, in each of these cases, the same dynamics can be found. First, security requirements constitute the primary cause of secrecy regimes. Diplomatic constraints and domestic choices then explain the varying boundaries of secrecy, fostering different forms of restricted democracy – from Israel, where nuclear weapons are simply absent from democratic government to the United States, where Congress exerts a relatively high control over policy. In all cases, however, democracy does not come out of nuclearization unharmed.

a. United States

The US is the original nuclear state, the first state to acquire nuclear weapons in 1945. Its nuclear history is unique in many regards, and it is characterized, first, by a relatively low level of secrecy compared to other nuclear states and, second, by a higher level of control exerted by the legislature. This, however, does not imply that it is not a restricted democracy. Many aspects of US nuclear policy escaped, and still escape, democratic control.

The history of the US regime of nuclear secrecy has been laid out in great detail by Wellerstein in his *Restricted Data*. Wellerstein shows how the US regime of secrecy over nuclear weapons emerged out of security considerations related to the possible uses of nuclear technologies by other states. During the war, as discussed in chapter 2, these considerations were related to wartime constraints. After the war, they were related to the fear of a Soviet bomb and the desire to keep a technological edge over competitors in a nuclear-armed world – an imperative that arose because none of the key players seriously fought for an international control regime.[7] That said, since the very beginning, considerations of domestic politics also played a role in the definition of the boundaries of nuclear secrecy, as keeping

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[6] On plausibility probes, see Harry Eckstein, "Case Study and Theory in Political Science," in *Case Study Method: Key Issues, Key Texts*, ed. Roger Gomm, Martyn Hammersley, and Peter Foster (London: SAGE, 2000), 141–43.
[7] Wellerstein, *Restricted Data*, chap. 4.

Congress from knowing too much about nuclear policy was an important concern for officials in the executive.[8] But Congress was not just a victim of secrecy – it was also an active orchestrator of it. Indeed, one must note the important role of Congress in defining the boundaries of secrecy. For example, the McMahon act came as the result of the advocacy of senator McMahon himself, and not because of the preferences of state officials.[9]

Domestic choices did play a role, but the mechanisms operated differently than in the three cases studied here, as the actors making the choices were more varied. What is missing in the US case, of course, is the influence of diplomatic pressure by an external hegemon. The absence of outside pressure, I would argue, probably helps explain why US nuclear secrecy is less radical than in other states. Unlike Britain or Sweden, which feared US disapproval when declassifying data, US officials only faced domestic actors – be it the public or officials representing other US institutions or agencies.

Did secrecy affect US democracy by limiting democratic control? The ability of Congress to control nuclear policy certainly was more important in the US than in France or the UK, and perhaps comparable to the Swedish case. There was a clear rise in control power after the 1980s.[10] This is likely because the US Congress has developed a unique institution which is the Joint-Committee on Atomic Energy, which allowed Congress to exert a certain level of oversight over force development policy.[11] The AEC ended up, in fact, "more closely integrated with Congress than the other independent commissions" and with a large access to classified information.[12] For James Lindsay, who studied Congress' influence over force development policy, "secrecy does not prevent [US] legislators from questioning weapons projects. Members (…) can obtain classified information, though it may take considerable persistence.

[8] For example, to keep them from knowing about the plutonium and uranium experiments conducted on patients between 1945 and 1947, and then between 1953 and 1957, without proper information on the procedure which aimed not at benefiting them medically but at studying the properties of those materials on human subjects. On this story, fully revealed only in the 1990s and recognized by the Clinton administration, see Eileen Welsome, *The Plutonium Files: America's Secret Medical Experiments in the Cold War* (New York: Dial Press, 1999).
[9] Robert David Johnson, "Congress and the Cold War," *Journal of Cold War Studies* 3, no. 2 (Spring 2001): 90.
[10] Lindsay, *Congress and Nuclear Weapons*, 38.
[11] On the development of this committee, see Harold P. Green and Allen Rosenthal, *The Joint Committee on Atomic Energy: A Study in Fusion of Governmental Power* (Washington D.C: The National Law Center, 1961).
[12] H. L. Nieburg, "The Eisenhower AEC and Congress: "A Study in Executive-Legislative Relations," *Midwest Journal of Political Science* 6, no. 2 (May 1962): 115.

Yet black spending makes it more costly in terms of time and effort for members to ask question".[13] This would indicate that, even though secrecy does not exclude the Congress entirely, it can still distort the information given to them, and thus limit their control over policy. It must be noted that the Congress was not consulted on the choice to build nuclear weapons in the first place. A certain level of denial and deference to secrecy exists too, and as the late Daniel Ellsberg put it, "past experience makes clear that Congress will not hold real investigative hearings, using committee subpoena powers, to penetrate the curtains of secrecy around these matters" unless forced to.[14] Moreover, US strategy remains essentially defined by the executive, and presented to the public in a biased manner. As Fred Kaplan notes, "in public, over the years, officers and officials have described America's nuclear policy as second-strike deterrence. In reality, though, American policy has always been to strike first (…), not just as an answer to a nuclear attack".[15]

Regarding nuclear harm, US nuclear testing exemplifies a similar story of concealment and deception regarding the actual consequences of tests. For example, the AEC long refused to acknowledge that fallout could have health effects around the Nevada test sites.[16] Similarly, as Eric Schlosser has shown, a large number of accidents involving nuclear weapons that could have resulted either in detonation or in spilling radioactive materials were concealed to the public. The American people was thus left largely unaware of the risks presented by the presence of nuclear weapons on US soil.[17] In summary, the nuclearization of the United States seems to have meaningfully restricted the scope of democratically controllable state actions.

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[13] Lindsay, *Congress and Nuclear Weapons*, 155–56. Eric Mlyn makes a similar argument about the Congress ability to control force development policy. Mlyn, *The State, Society, and Limited Nuclear War*. See also Stephen I. Schwartz, ed., *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons since 1940* (Washington, D.C: Brookings Institution Press, 1998).
[14] Daniel Ellsberg, *The Doomsday Machine: Confessions of a Nuclear War Planner* (New York: Bloomsbury, 2017), 346.
[15] Fred M. Kaplan, *The Bomb. Presidents, Generals, and the Secret History of Nuclear War* (New York: Simon & Schuster, 2020), 2.
[16] See Barton C. Hacker, *Elements of Controversy: The Atomic Energy Commission and Radiation Safety in Nuclear Weapons Testing, 1947-1974* (Berkeley: University of California Press, 1994), chap. 5.
[17] See Schlosser, *Command and Control*.

b. India

India's nuclearization followed a long and bumpy road. Though it tested its first atomic explosive device in 1974, it only acknowledged a military nuclear capability in 1998 – the first Indian test having been dubbed a "peaceful nuclear explosion" by the political leadership.[18]

But, already in 1948, when Nehru decided in favor of the creation of an Atomic Energy Commission, secrecy was considered. In fact, a debate between pro- and anti-secrecy quickly developed, as Nehru sought an even more stringent form of secrecy around nuclear research than either Britain or the US.[19] For Nehru, secrecy was justified simultaneously by industrial reasons (the need to protect Indian know-how from colonial powers), diplomatic concerns (the supposed need to assure the UK and US that cooperation with India would not lead to leaks), and clearly stated security reasons. Critics of secrecy emphasized that secrecy was necessary only if research was conducted for defense purpose but, as Nehru saw it, it was not possible to distinguish the two technologies. In India, like in Sweden and France, critics of secrecy only criticized the overstretching of its boundaries, not its principled necessity when it came to nuclear weapons.[20] These security concerns constituted the ground on which various other considerations would be made, justifying the extension of secrecy. Once the orientation of the program toward the production of an explosive device was decided – without, at first, Prime Minister approval[21] – concerns about US reactions were strong. Gaurav Kampani identifies the threat of US sanctions as a clear incentive to keep secrecy over nuclear research after 1974.[22] Such fear would last until the 1990s.[23] Finally, opacity had its domestic rationales too. Notably, opacity around the cost of the 1974 test prevented criticism of the project in a time of economic hardship for the country.[24] This does not mean

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[18] On the history of the Indian nuclear program, see Itty Abraham, *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial State* (London ; New York: Zed Books, 1998); George Perkovich, *India's Nuclear Bomb: The Impact on Global Proliferation* (Berkeley: University of California Press, 1999); Kampani, *India's Nuclear Proliferation Policy*; Sarkar, *Ploughshares and Swords*; Yogesh Joshi, "India's Nuclear Weapons Program," in *Routledge Handbook of the International Relations of South Asia*, ed. Sumit Ganguly and Frank O'Donnell (London: Routledge, 2022).
[19] Perkovich, *India's Nuclear Bomb*, 18.
[20] Perkovich, 19–20.
[21] Perkovich, 142.
[22] Kampani, *India's Nuclear Proliferation Policy*, 61.
[23] Kampani, 96.
[24] Sarkar, *Ploughshares and Swords*, 176.

that India has not debated nuclear acquisition. However, as Jayita Sarkar puts it, the Indian nuclear program – both civilian and military – "sustain[s] an antidemocratic culture in the largest democracy in the world"[25].

Control over Indian nuclear policy was clearly hampered by secrecy. For years, the existence of the program itself was opaque, meaning that external controllers were excluded. As discussed above, the costs of the program were also kept opaque, and oversight over force development policy was limited. Gaurav Kampani has described how the secrecy inside the program was such that even military actors were kept in the dark about nuclear strategy. As a result, the military did not know enough about the nuclear state's plans for nuclear use to practice them.[26] Regarding nuclear harm, no independent assessment of radioactive measurements following the 1974 test was done, meaning that no external control was possible. The nearby villagers had not been informed of planned activities – construction around the site was presented as an oil exploration project. All this secrecy was motivated by the Indian officials' desire to keep their project entirely secret from foreign eyes and US satellites, but also to avoid discussing the sensitive topic of radioactivity.[27] As a result, no form of democratic control surrounded these activities.

Though more research would be needed to assess how, exactly, nuclearization restricted the Indian democracy, it does seem that nuclear secrecy limited the Indian public's ability to control state actions in the nuclear domain. This seems to confirm the validity of my theory across both time and space, India being non-Western and a relative latecomer to the nuclear weapons world.[28]

c. Israel

Israel certainly is unique among nuclear-armed states when it comes to secrecy since it has never officially acknowledged its possession of nuclear weapons. Israel likely acquired nuclear weapons by

[25] Sarkar, 204.
[26] Kampani, *India's Nuclear Proliferation Policy*, 95.
[27] Sarkar, *Ploughshares and Swords*, 172–74, 203.
[28] It must be noted that Sarkar, Perkovich, Kampani and Abraham disagree on a large array of aspects of nuclear history. However, the way secrecy unfolded, and its democracy impact, seems to be an object of consensus among them.

1966–67, after starting the militarization of its nuclear program around 1957.[29] From the beginning to this day, the program was shrouded in the highest secrecy and kept out of democratic control.

Though the use of secondary sources makes it difficult to clearly establish how the structural constraints of nuclear technology shaped Israeli choices, it does seem to have caused Israeli officials to consider nuclear secrecy in the first place. Concerns about the security implications of nuclear knowledges emerged even before the military option was seriously considered.[30] Already in 1947, the discovery of uranium in the Negev was considered something to be kept secret.[31] In fact, when the program was decisively launched, the very reason why it was possible to keep it secret was the fact that nuclear research was already shrouded in secrecy. In the Israeli case, however, it is clear that diplomatic issues played a very important role. Though they do not explain the origins of secrecy, they explain the very specific shape it took. First, the French connection made the Israeli program particularly vulnerable to revelation. Because the nuclear deal with France to help build Dimona was controversial and made in such a way that only parts of the French state favorable to Israel were aware of it, it could easily have been undone by a change of government and both parties saw an interest in keeping it secret.[32] Inside the Negev desert, there existed a secret "French boom town" – "nothing comparable – or as secret had been created since Los Alamos".[33] Second, US pressure was a major issue for Israeli officials. In the 1960s, American suspicion about the Israeli nuclear program led to investigations and request by US officials to inspect Israeli installations. Fearful that the US would oppose their program, Israeli officials chose to conceal it as much as possible to prevent the hegemon from crushing their nuclear ambitions.[34] Although Israel seemingly managed to deceive US eyes until 1968, it was not possible afterwards. After pressure and negotiations – as well as acknowledgement within the US that the Israeli program had been firmly locked in – US and Israeli officials found a compromise: the policy of *amimut*, which implied

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[29] Avner Cohen, *Israel and the Bomb* (New York: Columbia University Press, 1998), 1–2.
[30] Physicists from the Israeli Atomic Energy Commission publishing on high-energy physics in 1952 were reprimanded for not submitting their paper for security clearance before presenting them. Cohen, 36–37.
[31] Seymour M. Hersh, *The Samson Option: Israel's Nuclear Arsenal and American Foreign Policy* (New York: Random House, 1991), 27.
[32] Cohen, *Israel and the Bomb*, 60.
[33] Hersh, *The Samson Option*, 46.
[34] Cohen, *Worst-Kept Secret*, 4.

maintaining ambiguity over Israel's nuclear capacity by never publicly confirming its existence.[35] Finally, domestic considerations played a role in deciding to keep the program entirely secret as, when it began, Prime Minister Peres' cabinet was not entirely onboard with the project.[36]

Nuclearization led to the creation of a specific institution, termed MALMAB, whose "top priority" is "to guard Israel's nuclear secrets and preserve nuclear ambiguity". This institution is so exceptional that the actual meaning of its acronym is not known, and observers rely on guesswork to make sense of it.[37] What is truly exceptional in Israel, however, is the Office of the Military Censor (or *Censora*), an institution in charge of scrutinizing all publications related to defense and foreign affairs, for which the "nuclear issue remains the most highly scrutinized subject of all."[38] The near total absence of debate about nuclear weapons policy in Israel means that the issue is entirely out of democratic control. Neither deliberation, nor oversight, nor accountability mechanism exists. As such, like the United States or India, nuclearization also restricted the Israeli democracy.[39]

Where Israel may seem to be in contradiction with my argument is in regard to the quasi-inevitability of revelation I discussed in chapter 4. I argued that the reason why France and the UK revealed their respective nuclear programs to their public was not a democratic spirit or strategic signaling, but the fact that the accumulation of contradiction made secrecy costly, and that revelation was necessary to extract more resources for the program's development via the states' respective parliaments. But Israel never revealed its capacity. Yet, it does not necessarily disprove my claim. First, the Israeli arsenal is incomparable in size – be it in terms of the number of warheads or delivery vehicles – to the British and the French ones. This means that the Israeli nuclear program has likely required fewer resources. In fact, its size can arguably be seen as evidence that total clandestinity constraints nuclear development.

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[35] Cohen, 27. On *amimut*, see also Adam Raz, "The Routinization of Nuclear Ambiguity," *Strategic Assessment* 18, no. 4 (January 2016): 29–42.
[36] Cohen, *Israel and the Bomb*, 63–64.
[37] Ali Diskaya, "Governing Nuclear Ambiguity at Home and Abroad: A Critical Analysis of Israel's Unique Bargain with the Bomb" (Doctoral Dissertation, Vienna, Central European University, 2021), 133.
[38] Cohen, *Worst-Kept Secret*, 113. Avner Cohen recounted his own experience with the *Censora* in the afterword to the French translation of *Israel and the Bomb*. See Avner Cohen, *Israël et la bombe: l'histoire du nucléaire israélien* (Plogastel Saint-Germain: Éditions Demi-lune, 2020), 459–84.
[39] On this see Cohen, *Worst-Kept Secret*, chaps. 6 & 7; Avner Cohen, "Israel," in *Governing the Bomb. Civilian Control and Democratic Accountability of Nuclear Weapons*, ed. Hans Born, Bates Gill, and Heiner Hänggi (Oxford: Oxford University Press, 2010), 152–70.

Second, and most importantly, for the program to remain unacknowledged requires massive efforts which involves the entire Israeli society, as Avner Cohen as argued. This shows that contradictions do exist. The Israeli state and its society have accepted the cost of keeping the "worst-kept secret" and solved those contradictions by assenting to *amimut*.[40] Though everyone is aware of it, it remains a public secret, because it cannot be publicly acknowledged without the risk of strong social sanctions.

d. <u>NATO Nuclear host-states</u>

A last set of cases could be the nuclear-host states, i.e. democratic states that host another country's nuclear weapons on their soil. These states differ from the US, India, and Israel in that they did not necessarily undergo a process of nuclear pursuit or acquisition, and hence did not undergo the same kind of nuclearization. Though these are not nuclear-armed states in the proper sense of the term, they do have nuclear secrecy regimes.[41]

It seems that the primary reason for the relevant security arrangements was an apprehension that someone unauthorized could get their hands on weapons and/or their launch orders.[42] This would imply that the structural constraint of nuclear technology constitutes the basic justification for secrecy. But the scope of secrecy which can be justified by security is, in fact, limited. As one expert puts it, part of this secrecy "look[s] rather, well, silly."[43] Indeed, even though the location, approximate number and type of bombs on those sites are relatively well known,[44] the very presence of bombs on the relevant

[40] Cohen, *Worst-Kept Secret*, chap. 5.

[41] There are, currently, 5 nuclear host-states (Germany, the Netherlands, Italy, Turkey and Belgium). All of them are NATO members, and democratic states. Outside of NATO, Belarus has recently declared its intention to host Russian nuclear weapons, and to have already started to host some, but no independent confirmation of this fact has been provided to this date (10th July 2023). Lidia Kelly and Andrew Osborn, "Belarus Starts Taking Delivery of Russian Nuclear Weapons," *Reuters*, June 14, 2023, sec. Europe, https://www.reuters.com/world/europe/belarus-has-started-taking-delivery-russian-tactical-nuclear-weapons-president-2023-06-14/.

[42] See, in this sense, Memorandum for the Record by Major H.F. Williams, "General Norstad's Visit to [Volkel Air Force Base, The Netherlands] on 29 March 1961," 5th April 1961, Secret, available online at: https://nsarchive.gwu.edu/document/23731-memorandum-record-major-h-f-williams-executive-assistant-saceur-general-norstad-s. On secrecy over launch order, see Hans M. Kristensen, "U.S. Nuclear Weapons in Europe. A Review of Post-Cold War Policy, Force Levels, and War Planning." (Washington D.C: Natural Resource Defense Council, February 2005), 20.

[43] Hans M. Kristensen, "Nukes in Europe: Secrecy Under Siege," *Federation of American Scientists* (blog), accessed June 23, 2023, https://fas.tghp.co.uk/publication/secrecyundersiege/.

[44] Sometimes thanks to inadvertent leaks, see Foeke Postma, "US Soldiers Expose Nuclear Weapons Secrets Via Flashcard Apps," bellingcat, May 28, 2021, https://www.bellingcat.com/news/2021/05/28/us-soldiers-expose-nuclear-weapons-secrets-via-flashcard-apps/.

territories has never been officially acknowledged by officials whilst in office.[45] Security constraints can hardly explain this fact. Rather, it can be explained by both US diplomacy and domestic concerns.

The case of Cees Wiebes, who fought in court in the Netherlands to declassify documents related to Volkel airbase (where US nuclear weapons are stored) is a good illustration. When Wiebes asked for the declassification of certain agreements between the US and the Netherlands about the storage of nuclear weapons on Dutch territory, he reports that "Dutch officials asked the U.S. Embassy in the Hague whether the nuclear agreements could be declassified. The answer was (…) a flat no".[46] This shows the weight of US desires on Dutch democracy. But that is not sufficient. Indeed, as nuclear expert Hans Kristensen puts it, secrecy is "also used to chill a public debate that could otherwise result in a demand to withdraw the nuclear weapons from Europe".[47] As Kjølv Egeland has shown, nuclear umbrellas are not necessarily maintained only or primarily for security reasons. Actors on both sides of the nuclear patron–client relationship can have reasons to maintain a nuclear umbrella even if they believe it to lack military credibility, be it prestige, domestic politics, or economics.[48]

Domestic choices – the desire to avoid public debate – also explain the actual boundaries of nuclear secrecy in host states.[49] As a result, the presence of those weapons is *not* an object of democratic control in those states, as no form of oversight exists over them, and deliberation is very limited.[50] This means

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[45] Though former Dutch Prime Minister Ruud Lubbers openly confirmed it after leaving office. His declaration attracted a lot of criticism, notably from the Royal Dutch Air Force, whose spokesman reacted by saying that those issues were "never spoken of" in public, as Lubbers "knows well". Harvey Morris, "Former Dutch Leader Steps Into U.S. Nukes Debate," New York Times, June 13, 2013, https://archive.nytimes.com/rendezvous.blogs.nytimes.com/2013/06/10/former-dutch-leader-steps-into-u-s-nukes-debate/; "US Nuclear Bombs 'based in Netherlands' - Ex-Dutch PM Lubbers," *BBC News*, June 10, 2013, sec. Europe, https://www.bbc.com/news/world-europe-22840880.

[46] Cees Wiebes and William Burr, "US Nuclear Weapons in the Netherlands: A First Appraisal," *National Security Archive* (blog), January 15, 2021, https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2021-01-15/us-nuclear-weapons-netherlands-first-appraisal#_ednrefA.

[47] Kristensen, "Nukes in Europe."

[48] Kjølv Egeland, "The 'Cosmic Bluff' Revisited: Extended Nuclear Deterrence in the U.S.–Norway Alliance" (Paper presented at the Nuclear Knowledges Research in Progress Seminar, Paris, June 29, 2022).

[49] It must be noted that, during the Cold war, certain states were not even aware that US bombs were stored on their territory. See Robert S Norris, William M. Arkin, and William Burr, "Where They Were," *Bulletin of the Atomic Scientists* 55, no. 6 (November 1999): 26–35.

[50] Though, it must be noted that Parliamentary debates do happen, as in Belgium where resolution to remove US weapons from the Belgian territory – where, officially, there are none – are frequently debated on. In 2020, such z resolution was narrowly rejected. It is not quite clear what would happen if it had passed. Thanks to Sanne Verschuren for the example. Gabriela, "Belgium Narrowly Rejects Removal of US Nuclear Weapons," The Brussels Times, January 17, 2020, https://www.brusselstimes.com/90143/removal-of-us-nuclear-weapons-from-belgium-narrowly-rejected-by-lawmakers-nato-kleine-brogel-deterrant-tpnw-un-npt-nuclear-heads.

that the implications of host states in the preparation for potential nuclear war in Europe is *not* something that citizens of those countries can control, nor can they actually assess the harm risks associated with the storage of nuclear weapons on their territory.[51]

This brief overview of different relevant cases shows the robustness of my theoretical framework when applied to other states. Of course, it would have to be researched more thoroughly based on primary sources. Nevertheless, it confirms the role played by technological constraints, diplomatic pressure and domestic choices in the emergence of secrecy regimes, and the subsequent consequences on democratic control. All nuclear-armed democracies seem, to varying extents, to be restricted democracies following nuclearization. This has several implications for our understanding of democracy in the nuclear age.

3. It could have been different: the paths not taken.

In this study, I have showed that the pursuit of nuclear weapons should not be understood as a mere process of procurement of a specific material capability, but as a process of political change with adverse effects on democratic government. Pursuing nuclear weapons is not only about choosing certain kind of weapons, but also about choosing a certain form of political system, which I termed restricted democracy, in which citizens hold a limited ability to control their state's ability to exert apocalyptic violence. In this last section, I want to consider the implications of this conclusion, starting with the question: could it have been otherwise?

I have insisted on the intrinsic properties of nuclear weapons, as well as on external constraints as drivers of secrecy regimes. However, one conclusion from this dissertation is also that these secrecy regimes could have taken a different shape if actors so desired. The Swedish case shows that meaningful democratic deliberation over nuclear acquisition was at least possible. In a modest rewrite, UK and

[51] Indeed, there has been examples of nuclear missiles stored in Italy being hit by lightning in 1962, which led to a battery fire and the release of tritium gas into the fissile core, an incident which could have led to a detonation. (Schlosser, *Command and Control*, 329.) Even short of such catastrophic outcomes, Hans Kristensen notes that "detonation of the chemical high explosives in the weapon would likely scatter plutonium and other radioactive materials. An accident inside a vault or shelter potentially would have local effect, while pollution from the crash of a C-17A cargo aircraft carrying several weapons could be a lot more extensive." Hans M. Kristensen, "Was There a U.S. Nuclear Weapons Accident At a Dutch Air Base? [No, It Was Training, See Update Below]," *Federation of American Scientists* (blog), accessed June 23, 2023, https://fas.tghp.co.uk/publication/volkel-nuclear-weapon-accident/.

French officials could clearly have been more upfront about the costs of nuclear development.[52] Though full transparency might have jeopardized security, it was possible to be less secretive about the financial burden of the respective nuclear programs, at any rate as they were openly declared. Similarly, nothing forced state officials to keep fallout measurements secret, lying about radioactive contamination, or unjustifiably claiming control over mishaps and near accidents. These were choices, justified by the actors' desire to see their preference go undebated while escaping responsibility for their acts. Technology had nothing to do with that. While the actors were partly constrained by the security implications of nuclear knowledges, they made choices and those choices heavily affected outcomes. *Democracy could have been much less restricted than it was*.

But, still, it is difficult to imagine a scenario in which actors would *not* have been constrained by technology and the best-case scenario is one in which secrecy would have been reduced to tighter boundaries. In that case, democratic control would have remained restricted, albeit less so and perhaps it would be possible to minimize those restrictions in such a way that they could be acceptable – though this seems unlikely, especially because it is difficult to imagine transparency over aspects as sensitive as nuclear strategic plans, even though this domain of policy may be the one that needs the highest level of control. But democracy would remain vulnerable to abuses of state secrecy. Because secrecy over nuclear issues would remain necessary, an "imperative", it means that state officials would always have the means to conceal certain information if they wished to do so. Nuclearization made this possible by creating the constant necessity for information control and by implication offering state officials resources they would not have had otherwise. This vulnerability in the democratic system does not have to be exploited systematically. However, its presence indicates a flawed institutional design, meaning that good governance would be dependent on the good faith of governors – instead of being guaranteed by the design of state structures.

Interestingly, the vulnerability created by the "secrecy imperative" is not even related to the *possession* of nuclear weapons, but to the possession of nuclear knowledges. The Swedish case is evidence that this

[52] On the rule of "minimal rewrite", see Richard Ned Lebow, "What's So Different about a Counterfactual?," *World Politics* 52, no. 4 (July 2000): 568.

claimed necessity for secrecy remains, even years after the last grams of plutonium left Swedish laboratories. For nuclear secrecy to disappear it would most likely require a change in the security-material context and the adoption of an international control regime. Even then, the structural constraints of nuclear technology would remain since, "once nuclear fission has been discovered, we live in a nuclear material context whether or not any nuclear weapons (technics) actually exist".[53] However, a different security-material context would lead them to express very differently – possibly, as argued in chapter 2, by causing to a rise in transparency rather than one in secrecy. But until that happens, nuclear weapons are deemed to profoundly affect democratic states.

These findings have implications for our understanding of the nuclear age more generally. They shed a new light on "Western Europe's democratic age"[54], by showing how the nuclearization of certain European democracies led to a qualitative restrictions to democratic government – by contrast with a "second wave of democratization" narrative which insists on the spread of democracy post World War Two.[55] More than this, they point to the necessity of looking at the domestic consequences of the nuclear revolution. This would, first, lead to a new interpretation of the 20th century. As Jonathan Schell wrote, the history of the "real Twentieth Century" cannot "possibly be told without taking into account the greatest means of violence ever created."[56] Yet, it most certainly has been told in such a way, at least if one focuses on the historiography of politics inside nuclear-armed states. Including nuclear weapons into the narrative allows to see forms of undemocratic state development one would not have seen otherwise. Second, they also encourage to think differently about current modernization programs which aim to perpetuate nuclear arsenals for decades to come. Debates between advocates of those programs and proponents of abolition essentially revolve around the (in)security implications of nuclear modernization.[57] But nuclear possession is not simply a choice over the kind of capabilities necessary for a state's security. It is, as well, a choice of a specific kind of political system, which must constantly

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[53] Deudney, *Bounding Power*, 296, fn. 46.
[54] Conway, *Western Europe's Democratic Age, 1945-1968*.
[55] Huntington, *The Third Wave*.
[56] Jonathan Schell, "Nuclear Weapons and the Real Twentieth Century," in *The Fate of the Earth & The Abolition* (Stanford: Stanford University Press, 2000), vii.
[57] Mian and Pelopidas, "Producing Collapse. Nuclear Weapons as Preparation to End Civilization," 328.

accommodate the security implications of those weapons, restricting democracy in the process. Making those democratic costs visible changes the implications of those debates.

4. <u>Implications for future research</u>

The findings presented in this dissertation, it must finally be underlined, are necessarily an *underestimation* of nuclearization's effects on democracy. I have focused solely on how nuclearization lead to the emergence of nuclear secrecy regimes, and how these affects three modes of democratic control over state actions. But there exist reasons to believe that nuclearization did much more than that. The history of knowledge production about the nuclear age shows a quasi-systematic under-evaluation of nuclear weapons' effects. The "fire effects" of nuclear bombings were long neglected.[58] The possibility of nuclear winter, too, remains frequently unaccounted for by policymakers.[59] Similarly, we assumed an accurate knowledges of the role of luck in the prevention of nuclear explosion. Eventually, the field has remained generally blind to the effects of nuclear weapons on democratic government. More can be done to make visible their effects. Specifically, it would be important to consider how nuclearization empowered sub-state actors, enhanced the executive's domination over other powers, and favored the development of certain fields of professionals entrusted with considerable power and very little accountability.

First, I have hinted at how secrecy affected the relation not only between the state and the parliament, or the state and the public more generally, but also between representative and non-representative governments agencies. In France, for example, the CEA acquired such a high level of autonomy that it could lie to the executive and carry on its own diplomacy – notably with Israel and India.[60] In Sweden, FOA seemed to seek such autonomy too, when some of its employees attempted to use the "freedom of action" line to build a fully-formed nuclear weapons – without fissile material – in the name of

[58] See Eden, *Whole World on Fire*.
[59] As discussed most recently in James Scouras, Lauren Ice, and Megan Proper, "Nuclear Winter, Nuclear Strategy, Nuclear Risk" (New York: The Johns Hopkins University Applied Physics Laboratory, 2023).
[60] Nicolas Blarel and Jayita Sarkar, "Substate Organizations as Foreign Policy Agents: New Evidence and Theory from India, Israel, and France," *Foreign Policy Analysis* 15, no. 3 (July 1, 2019): 413–31.

"protection research". Therefore, the effects of nuclear secrecy on the executive's ability to control its administration should be the object of further research.

Second, there exists no reason to think that the structural constraints of nuclear weapons only create a need for secrecy. Particularly, they seem to create a need for speed. Early on, Dahl noted that "in the Atomic age, indeed, lack of speed may well prove to be the Achilles' heel of American democratic institutions".[61] Only concentration of power on the hands of a few people can offer the swiftness necessary to react, which leads to the "thermonuclear monarchy" decried by proponents of nuclear despotism discussed in chapter 1. But researchers focused on the US state have also argued that the "bomb power" has led to a *general* increase of executive power.[62] Therefore, how nuclearization affects the structures of executive power remains a question to be answered. In the French case, some have argued that nuclear acquisition played a role in the decision to elect the President via universal suffrage, a reform which transformed its place in the French constitutional system and enhanced the executive's power relative to the legislative.[63] Assessing whether or not such changes in state structures can be associated with nuclearization, and whether or not they led to new restrictions on democratic control, would be an important topic for future research. Moreover, as the case of host-states show, it would be interesting to determine whether restrictions on democracy are similar when a state acquires or host nuclear weapons.

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[61] Dahl, *Congress and Foreign Policy*, 251. It must be noted here that arguments about speed predated the age of missiles. This probably deserves a longer discussion than can be afforded here. Generally speaking, it remains true that the invention of ICBM changed the problem radically because it made public consultation utterly *impossible*, while long-range bombers "simply" made it extremely difficult. The problem of speed is contained in the atomic bomb itself and not in its vector, because it can cause a large-scale destruction, that would otherwise require large planning and societal involvement over months, on an extremely concentrated timetable. At the time of Dahl's writing, however, the timetable was not yet a matter of minute. In 1948, US atomic bomb indeed "took thirty-nine men and more than two days to assemble" – something likely unknown to Dahl (David Alan Rosenberg, "U.S. Nuclear War Planning, 1945-1960," in *Strategic Nuclear Targeting*, ed. Desmond Ball and Jeffrey T. Richelson (Ithaca: Cornell University Press, 1986), 38.) As some observers nevertheless noted, such planning could still be done secretly, which meant that "what is perhaps the scariest about atomic war is the suddenness with which it can be triggered, without until the last moment any clue of its imminence could be detected" (Général ***, *Verrons-Nous Une Troisième Guerre Mondiale ?* (Monaco: Editions L. Jaspard, 1946), 36. Our translation). This is likely what Dahl refers to when considering the problem of speed in relation to the executive's power information differential.

[62] See Wills, *Bomb Power*.

[63] The argument is that de Gaulle thought that only a president vested with the full legitimacy of the universal suffrage could credibly threaten nuclear use in the name of the entire nation. See Bernard Chantebout, "La Dissuasion Nucléaire et Le Pouvoir Présidentiel," *Pouvoirs*, no. 38 (1986): 22.

Another topic worthy of scholarly attention would be the effect of nuclear weapons pursuit on the emergence of a particular form of civilian expertise within democratic states. This expertise, uniquely entrusted with nuclear knowledges, is characterized by its structural inability to tell the truth of nuclear vulnerabilities because of the discursive constraints of deterrent strategies. Semi-official experts are invariably reluctant acknowledge the potential vulnerability of their state's nuclear policy as expert discourse often serves a performative role. As Benoît Pelopidas notes, "since they are trying to create and maintain a credible deterrence, officials and para-official experts cannot express the possibility of its failure and of the nuclear war that would ensue".[64] How did this field of expertise emerge and how did it affect the democratic public space? The study of nuclear policy experts as a "transnational guild" of security professional has not been conducted yet, even though such a work has been conducted for others kind of profession who also operate in relation with secrecy, indicating yet another potential path for future research on the transformation of states following nuclearization.[65] Finally, and as discussed in chapter 5, how nuclearization accelerated the development of surveillance infrastructure remains to be explored in depth.[66]

How nuclear weapons transformed not only the world, but the state and democracy remains an understudied field. As a result, scholars, policymakers, and citizens continue to think about nuclear weapons without a full understanding of what they are or what they do. Peter Hennessy's quote opening this chapter provides an example of this: ignoring both the possibility of Armageddon and other costs of nuclearization, it reduces nuclear weapons to a matter of "tangible" finances and "intangible" protection, assuming perfect control and invulnerability once nuclear sovereignty has been achieved. But the nuclearization of the world did more. It spread radioactive material all over the planet, affecting people and the environment. It put the world many times on the brink of total destruction which, thanks

[64] Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, 193. See also, 192-195.
[65] On the sociology of security professional in the intelligence sector, see Didier Bigo, "Sociology of Transnational Guilds," *International Political Sociology* 10, no. 4 (December 2016): 398–416; Didier Bigo, "Shared Secrecy in a Digital Age and a Transnational World," *Intelligence and National Security* 34, no. 3 (April 16, 2019): 379–94.
[66] On this, see Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, 279.

to luck, we have escaped so far. It also structurally limited the ability of citizens in a nuclear state to govern themselves.

It is possible that, thanks to luck, we go through the nuclear age without having to suffer the material effects of nuclear weapons use again – though parts of the world still suffer the effects of uranium mining, while others grasp with the cancerous legacy of nuclear testing.[67] But their effects on our democracies, however, will remain as long as these weapons exist. They will not simply "rust in peace". Even in the silence of their storage, they continue to affect the world around them, and to hurt democracy – the political ideal which justified their construction in the first place.

[67] On uranium mining and its human consequences, see Hecht, *Being Nuclear*. On the worldwide legacy of nuclear testing, see Jacobs, *Nuclear Bodies*.

<u>List of archives used in the dissertation.</u>

- **The National Archives, Kew, United Kingdom.**

AB – Archives from the Atomic Energy Authority.

AVIA – Archives from the Ministry of Aviation.

CAB – Archives from the Cabinet Office.

ES – Archives from the Atomic Weapons Research Establishment.

FO – Archives from the Foreign Office.

PREM – Archives from the Prime Minister's Office.

- **Archives Nationales, Pierrefitte-sur-Seine, France.**

AG(5) – Archives from de Gaulle's presidency.

19760078 – Archives from Direction of Aerial Navigation.

19760161 – Archives from the General Direction for Public Health.

19820427 – Archives from the National Geographic Institute.

19800284 – Archives from the National Center for Scientific Research (CNRS).

19920172 – Archives from the Direction for Regulations at General Directorate of National Police.

19940219 – Archives from the Polynesia mission in the subdivision for Political Affairs at the Ministry for Outre-Mers.

19940227 – Archives from the subdivision for Political Affairs at the Ministry for Outre-Mers.

19940390 – Archives from the *Outre-Mers* Minister's cabinet.

19950317 – Archives from the Ministry of Justice.

20110033 – Archives from Alain Peyrefitte.

20180707 ; 20190707– Archives from the *Cour des Compte.*

307AP – Private archives Raoul Dautry.

560AP – Private archives from René Pleven.

569AP – Private archives from Pierre Lefranc.

571AP – Private archives from Joël le Theule.

551AP – Private archives from Admiral Marcel Duval.

553AP – Private archives from André Boutemy.

- **Service Historique de la Défense, Vincennes, Paris**

F60 – Archives from the Government's General Secretariat.

AI I 371 – Archives from the Vth Aerial Region Commandment in Algeria.

GR 1 Q – Archives from the President General Staff (IVth Republic).

GR 13 R – Archives from the DIRCEN.

- **Other French archives**

3DV-DR – Private archives from Paul Delouvrier, Service Historique de Sciences Po, Paris

CHA – Private archives from Jean Charbonnel, Service Historique de Sciences Po, Paris

Obsarm – Archives from the *Observatoire des Armements*, Lyon.

Archives Joliot-Curie, Musée Joliot-Curie, Paris.

- **Riksarkivet, Arninge, Sweden.**

AK – Archives from the *Atomkommité*.

CFS – Archives from the Civil Defence Directorare (*Civilförsvarsstyrelsen*).

FOA – Archives from the *Fösvarets Forskningsanstalt*.

Fösvarsstaben – Archives from the Army's General Staff.

Armétygförvaltningen – Archives from the Army Administration.

Private archives from Richard Åkerman.

Private archives from Carl Erik Almgren.

- **Riksarkivet, Marieberg, Sweden.**

HP – Archives from the Ministry for Foreign Affairs.

Försvarsberedningen Arkiv – Archives from the 1956 Defense Parliamentary commission.

- **Workers' movement (*Arbetarrörelsens*) archives and library, Huddinge, Sweden.**

Archives from Tage Erlander

- Online archives:

CEA/DAM – Online archives from the Directory for Military Applications of the CEA. https://www.memoiredeshommes.sga.defense.gouv.fr/fr/arkotheque/inventaires/ead_ir_consult.php?ref=Essais_Polynesie.

A6456 – Records from Royal Commission into British Nuclear Tests in Australia, https://recordsearch.naa.gov.au/SearchNRetrieve/Interface/DetailsReports/SeriesDetail.aspx?series_no=A6456&singleRecord=T.

United States Digital Library, https://digitallibrary.un.org

FRUS - Foreign Relations of the United States, https://history.state.gov/historicaldocuments

National Security Archives, https://nsarchive.gwu.edu

Wilson Center Digital Archives, https://digitalarchive.wilsoncenter.org

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Des démocraties restreintes

Programmes nucléaires, secret d'Etat et démocratie au Royaume-Uni, en France, et en Suède.
(1939-1974)

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Résumé

[1]Les armes nucléaires entretiennent une relation complexe avec les gouvernements démocratiques, car leurs caractéristiques essentielles entrent en contradiction avec les conceptions démocratiques de l'État. Elles sont, écrit Daniel Deudney, "intrinsèquement despotiques", et ce pour trois raisons : "la rapidité des décisions d'utilisation du nucléaire ; la concentration de la décision d'utilisation du nucléaire entre les mains d'un seul individu ; et le manque de responsabilité découlant de l'incapacité des groupes concernés à faire représenter leurs intérêts au moment de l'utilisation du nucléaire".[2] Ces faits n'ont pas échappé aux philosophes politiques, comme Elaine Scarry, qui conclut que les Etats-Unis ne sont pas une démocratie dotée de l'arme nucléaire, mais une "monarchie thermonucléaire" où le président possède un pouvoir de vie et de mort sur l'ensemble de sa population, ainsi que sur les populations des autres Etats.[3] Cette conclusion radicale n'est pas partagée par tous, mais les principaux spécialistes des études de sécurité ont également noté que la gouvernance des armes nucléaires se caractérise par un "déficit de démocratie".[4]

Dans ces conditions, il semble important de formuler la "question de la démocratie nucléaire", à savoir : les dispositions politiques nécessaires pour gouverner les armes nucléaires sont-elles compatibles avec un gouvernement démocratique ? La question de la démocratie nucléaire, au niveau le plus élémentaire, est de savoir si les armes nucléaires peuvent être gouvernées démocratiquement et quelles sont les conséquences d'une réponse négative pour notre compréhension de la démocratie dans les États dotés d'armes nucléaires. Pour y répondre, je me concentre sur la manière dont la poursuite de la technologie nucléaire affecte les arrangements politiques des États démocratiques et la capacité du public à exercer un contrôle sur les actions de l'État. En d'autres termes, un État démocratique est un État dont le mode de gouvernement répond aux critères de base de la démocratie, notamment en termes de contrôle démocratique sur les actions de l'État. Plus précisément, je cherche à répondre à la question suivante :

Comment le processus de recherche et de possession d'armes nucléaires affecte-t-il les modes de contrôle au sein des États démocratiques ?

Dans cette thèse, je soutiens que la quête d'armes nucléaires n'est pas simplement un processus de développement technologique ou d'acquisition d'armes. Je m’inspire des approches matérialistes des études sur la science et la technologie qui conceptualise les technologies comme des objets dotés d’une « capacité agentique », capable de participer à la constitution des structures sociales en créant des contraintes ou opportunités pour les acteurs. Je soutiens que la poursuite des armes nucléaires est également *un processus de changement politique* par lequel la technologie impose ses contraintes aux acteurs, affecte les structures de l'État et restreint le champ des choix démocratiquement décidables. Je qualifie ce processus de "*nucléarisation*". L'acquisition d'armes nucléaires change la nature du gouvernement démocratique, produisant des *démocraties restreintes*, des régimes qui satisfont à la plupart des critères d'un gouvernement démocratique, mais où la capacité de l'État à exercer une violence extrême à l'échelle mondiale échappe au contrôle démocratique, ce qui signifie que les citoyens sont empêchés de se gouverner véritablement eux-mêmes. Le problème n'est pas que les armes nucléaires ne sont pas gouvernées démocratiquement, mais qu'elles *ne peuvent pas* l'être. Selon moi, les armes nucléaires affectent toute la structure des États démocratiques. Pour ce faire, j'ai choisi de me concentrer sur la manière dont la recherche d'armes nucléaires a conduit au développement de régimes de secret nucléaire et sur la manière dont ces régimes ont fini par affecter le contrôle démocratique de la politique au Royaume-Uni, en France et en Suède entre 1939 et 1975.

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2 Deudney, *Bounding Power*, 255.
3 Scarry, *Thermonuclear Monarchy*, 24–27.
4 Born, Gill, and Hänggi, *Governing the Bomb*, 230.

La nucléarisation des États démocratiques : Résumé de l'argument.

Pour déterminer comment la poursuite des armes nucléaires affecte le gouvernement démocratique, j'ai choisi d'examiner, premièrement, comment la nucléarisation a affecté les structures de l'État et, deuxièmement, si les structures nouvellement formées ou transformées permettaient un contrôle public sur les actions de l'État. Par gouvernement démocratique, j'entends le mode de gouvernement au sein d'un État donné - un État est démocratique s'il est gouverné démocratiquement. Le point de départ est que, puisque le gouvernement démocratique d'un État dépend de la nature de ses structures - la "configuration institutionnelle dans laquelle les acteurs politiques opèrent"[5] - l'évaluation de la façon dont la nucléarisation a affecté ces structures permet d'évaluer ses effets sur le gouvernement démocratique. Pour ce faire, je me concentre sur le développement des régimes de secret nucléaire en tant que résultat de la nucléarisation. Mon argument est que les implications sécuritaires de la technologie nucléaire créent inéluctablement des contraintes structurelles pour les acteurs étatiques, les poussant à développer des régimes de secret qui, à leur tour, sapent toute possibilité de contrôle démocratique significatif. Parce que le secret interagit avec les modes de contrôle démocratique, ces régimes empêchent le public d'exercer un contrôle approprié sur les questions nucléaires, érigeant des barrières autour d'un domaine spécifique - et crucial - de l'action de l'État, ce qui signifie que le gouvernement démocratique au sein de l'État nucléaire ne peut être que structurellement restreint.

La principale variable sur laquelle je me concentre est celle des *contraintes structurelles* créées par la technologie nucléaire. Je soutiens que la nature exceptionnelle des armes nucléaires crée des contraintes structurelles pour les acteurs qui doivent tenir compte des implications de l'existence des armes nucléaires en matière de sécurité. Dans un monde où les armes nucléaires ont été inventées, la "frontière des possibilités de destruction" a été fondamentalement modifiée et ce contexte matériel transforme l'environnement des acteurs.[6] Simplement, les acteurs d'un jeu nucléaire sont obligés de se confronter à la perspective de la destruction de leur État au cours d'une après-midi. Cela dit, ce que ces contraintes produisent n'est pas déterminé par la technologie, mais par le "*contexte matériel de sécurité*", qui est déterminé par les types de restrictions à la violence nucléaire qui existent.[7] L'invention d'armes nucléaires n'a pas les mêmes implications s'il existe un contrôle international de l'énergie atomique que s'il n'en existe pas, étant donné qu'un contrôle international peut offrir des formes fortes de restriction de la violence nucléaire.

Je soutiens que les armes nucléaires invitent inévitablement à la construction de régimes de secret étendus. L'imposition de régimes de secret permet aux États dotés de l'arme nucléaire de limiter à la fois la diffusion des armes nucléaires et l'accès des concurrents à des informations sensibles sur les sites nucléaires, les plans et les déploiements d'armes et, par extension, sur les vulnérabilités de chacun. Pour les États pratiquant la dissuasion nucléaire, il est nécessaire de protéger toute avancée technologique par le secret, c'est-à-dire par des pratiques de contrôle de l'information conçues pour "empêcher d'autres personnes d'obtenir des informations que vous ne voulez pas qu'elles aient".[8] C'est pourquoi le secret devient nécessaire, en tout cas tant qu'un contrôle international significatif de l'atome reste hors de portée.

Les types de contraintes structurelles ou d'incitations décrits ci-dessus ne sont pas les seuls mécanismes conduisant au développement de régimes de secret. Dans le troisième chapitre, je montre que deux autres

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[5] Tuong Vu, "Studying the State through State Formation", *World Politics* 62, no. 1 (janvier 2010) : 150.
[6] Deudney, *Bounding Power*, 296, fn. 46.
[7] En ce qui concerne l'influence du contexte matériel de sécurité sur les acteurs, je me réfère à Deudney, “Geopolitics as Theory.”
[8] Wilsnack, “Information Control,” 471.

mécanismes doivent être pris en compte. Le premier est la *pression diplomatique* exercée par l'hégémon (c'est-à-dire les États-Unis) pour empêcher la diffusion de la technologie nucléaire et conserver son avance technologique. L'autre mécanisme est celui des *choix domestiques* des acteurs, qui déterminent les limites maximales des régimes de secret nucléaire. Si les contraintes structurelles expliquent *pourquoi les* régimes de secret se sont développés, elles n'expliquent pas complètement *comment* ils se sont développés et ce que le secret nucléaire a fini par englober. Par exemple, aucune forme de contrainte technologique inhérente ne peut expliquer pourquoi les programmes nucléaires britanniques, français et suédois sont restés secrets pour les populations respectives de ces États. Seules les préoccupations liées à une éventuelle contestation interne peuvent l'expliquer. L'évolution du régime du secret nucléaire peut donc être résumée comme suit :

Le problème, pour les États démocratiques, est que le secret produit divers mécanismes qui affectent directement la capacité du public à contrôler les actions de l'État. Il crée des *restrictions* au contrôle démocratique. Les régimes de secret peuvent exclure le public de la prise de décision, en limitant la connaissance d'une politique donnée à un petit nombre de fonctionnaires. Ils peuvent également fausser les informations données au public sur certaines actions que les fonctionnaires de l'État ont l'intention de mener, en brouillant leurs coûts ou en obscurcissant leurs justifications réelles. Enfin, le secret facilite également le déni, en favorisant les secrets publics dont il ne faut pas parler.[9] Par conséquent, un contrôle efficace des actions passées, présentes et futures de l'État est rendu impossible par la nécessité du secret nucléaire. Je soutiens donc que les armes nucléaires produisent des *démocraties restreintes*, où certaines parties de l'État sont structurellement hors de portée des citoyens, ce qui sape fondamentalement la capacité du public à se gouverner lui-même en limitant la capacité des citoyens à contrôler correctement le niveau de violence que leur État est prêt à exercer en leur nom.

Cela signifie-t-il que les arrangements politiques nécessaires à la gestion des armes nucléaires sont incompatibles avec un gouvernement démocratique ? Après tout, les États dotés d'armes nucléaires étudiés dans cette thèse n'ont pas entièrement cessé d'être démocratiques à cause des armes nucléaires. Ils organisent toujours des élections, les parlements votent des projets de loi, les citoyens peuvent contester les décisions politiques. Cependant, l'État nucléaire semble former un État dans l'État, hors de portée du public. La question peut être posée comme suit : les restrictions créées par la technologie nucléaire sont-elles des mouches dans la pommade ou des cafards dans la soupe ? Dans son livre *Compromis et compromis pourris*, le philosophe Avishai Margalit propose cette métaphore colorée pour distinguer les situations dans lesquelles des éléments "pourris" gâchent l'ensemble ou seulement une partie d'un objet donné. Alors que les mouches dans la pommade peuvent être simplement enlevées, "la meilleure soupe est totalement gâchée par un seul cafard". [10]

Je soutiens que les armes nucléaires sont des cafards dans la soupe démocratique. Il n'est pas possible de les détacher simplement de l'économie générale du pouvoir à l'intérieur de l'État démocratique et d'affirmer que les démocraties dotées d'armes nucléaires sont des démocraties comme les autres. Il est vrai que toutes les démocraties sont limitées car "la démocratie est une forme politique incomplète par définition", comme l'a fait remarquer Pierre Rosanvallon.[11] Mais les démocraties nucléaires sont limitées d'une manière particulière. Tout d'abord, si la démocratie est limitée par *nature*, les restrictions créées

[9] L'anthropologue Michael Taussig a défini le secret public comme l'acte de "savoir ce qu'il ne faut pas savoir". Taussig, *Defacement*, 2.
[10] Margalit, *On Compromise and Rotten Compromises*, 97.
[11] Rosanvallon, *Democracy. Past and Future*, 204. L'idée de la démocratie comme forme naturellement limitée d'auto-gouvernement est largement admise, à la fois dans une perspective historique et théorique. Voir Przeworski, *Democracy and the Limits of Self-Government*; Dunn, *Setting the People Free*.

par le secret nucléaire ne sont en rien *naturelles*. Elles découlent de la recherche d'armes nucléaires, une activité que la plupart des États se sont abstenus d'exercer au cours des soixante-dix dernières années.[12] Deuxièmement, la politique nucléaire touche au cœur même de l'objectif fondamental de l'État, à savoir le contrôle et l'exercice de la violence au nom de ses administrés. Le problème n'est donc pas seulement que certaines parties de l'État nucléaire restent structurellement hors de portée des citoyens, mais que ces parties inaccessibles contrôlent le niveau et la nature de la violence que l'État est prêt à exercer. Parce qu'elles offrent la possibilité d'une destruction sans précédent, les armes nucléaires méritent un niveau de contrôle démocratique *plus élevé* que n'importe quelle autre question, puisqu'il n'existe pratiquement aucune autre question ayant des implications aussi importantes pour les citoyens.[13] En outre, les restrictions découlant du régime du secret ne sont pas uniquement le produit de l'action des acteurs - ce qui impliquerait que la nature restreinte de la démocratie nucléaire pourrait être annulée - mais le produit de contraintes matérielles imposées par les implications de la technologie nucléaire en matière de sécurité. Bien qu'il soit certainement possible de gouverner les armes nucléaires d'une *manière plus démocratique*, il n'est pas possible de les gouverner *démocratiquement*.

Contributions

En présentant la nucléarisation comme une forme de changement politique qui crée des restrictions au gouvernement démocratique, cette thèse vise à apporter quatre contributions à la littérature. La première est une contribution à l'étude de la démocratie à l'ère nucléaire et, plus spécifiquement, dans l'État nucléaire. La deuxième est une contribution à l'étude du secret nucléaire, un sujet relativement peu étudié. La troisième est une contribution empirique à l'histoire nucléaire des trois États étudiés. Enfin, les résultats ont plusieurs implications pour la recherche et la politique.

Premièrement, cette thèse contribue à notre compréhension des conséquences de la "révolution nucléaire" pour les États démocratiques. La "révolution nucléaire" est un concept controversé, mais elle peut être définie comme un changement soudain et massif des capacités matérielles de destruction des États à la suite de l'invention des armes nucléaires. Après la Seconde Guerre mondiale, les États ont mis au point des armes capables "d'exterminer une grande partie de la race humaine" si elles étaient utilisées dans une guerre majeure. Comme le note Campbell Craig, "cela n'avait jamais été possible auparavant et constitue donc, en soi, un développement révolutionnaire à tous points de vue".[14] La signification de ce changement profond des conditions matérielles dans lesquelles les démocraties existent n'a pas fait l'objet d'une attention particulière, que ce soit de la part des étudiants en démocratie ou de ceux qui étudient les armes nucléaires. La question nucléaire a été remarquablement absente de la récente vague d'études sur les déficits démocratiques dans les États démocratiques libéraux (et dotés de l'arme nucléaire).[15] Il est surprenant de constater que la question nucléaire est également absente des études classiques sur la démocratie réalisées après 1945. Les armes nucléaires sont généralement traitées dans

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[12] Voir Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, chap. 5.

[13] À l'exception, peut-être, de l'intelligence artificielle et du changement climatique qui créent tous deux la possibilité d'un effondrement de la civilisation, mais dont la gouvernance est très différente.

[14] Craig, "Review: The Revolution That Failed: Nuclear Competition, Arms Control, and the Cold War. By Brendan Rittenhouse Green. New York: Cambridge University Press, 2020.," 1304.

[15] Parmi les études sur le recul démocratique et la "post-démocratie", on peut citer Colin Crouch, *Post-Democracy*, Repr, Themes for the 21st Century (Cambridge: Polity Press, 2010); Hermet, *L'hiver de La Démocratie, Ou, Le Nouveau Régime*; Krastev and Holmes, *The Light That Failed*. Les historiens de la démocratie ne les considèrent pas non plus. Par ex : John A. Ferejohn et Frances McCall Rosenbluth, *Forged through Fire : War, Peace, and the Democratic Bargain* (New York : Liveright Publishing Corporation, 2017) ; Dunn, *Setting the People Free* ; Martin Conway, *Western Europe's Democratic Age, 1945-1968* (Princeton, NJ : Princeton University Press, 2020) ; David Stasavage, *The Decline and Rise of Democracy : A Global History from Antiquity to Today* (Princeton : Princeton University Press, 2020).

le cadre de questions techniques complexes, au même titre que l'énergie, les soins de santé ou la pollution.[16] Cela ne signifie pas qu'aucun auteur ne s'est penché sur le problème de la relation entre la démocratie et les armes nucléaires (voir chapitre 1). Cependant, peu d'analyses empiriques ont été réalisées sur les effets de la poursuite des armes nucléaires sur les États démocratiques en tant que tels. Par conséquent, les affirmations critiques concernant les effets despotiques de la technologie sur la démocratie n'ont pas encore été étayées par des preuves, tout comme les affirmations concernant l'inutilité des armes nucléaires pour le développement démocratique.

Deuxièmement, je contribue à notre compréhension du secret nucléaire en tant que phénomène politique. Le secret nucléaire occupe une place paradoxale dans la littérature sur les armes nucléaires, car aucun auteur n'ignore son existence, mais peu la problématisent. Lorsqu'il est mentionné, c'est généralement pour servir d'*explanans*. Il existe des exceptions mais celles-ci tendent à négliger deux éléments.[17] Le premier est le rôle de la capacité d'action de la technologie dans le développement du secret nucléaire - en d'autres termes, les auteurs n'abordent pas directement la question de savoir pourquoi tous les États qui ont développé des armes nucléaires se sont sentis obligés de les entourer d'un profond secret - et le second est la question de l'impact du secret sur la démocratie.[18] Dans cette thèse, j'établis un lien entre ces deux éléments, d'une part en déterminant comment les propriétés intrinsèques des armes nucléaires ont encouragé le développement de régimes de secret, et d'autre part en abordant la question de savoir comment ces régimes ont limité les gouvernements démocratiques.

Troisièmement, cette thèse contribue à l'étude de l'histoire nucléaire britannique, française et suédoise et plus généralement à l'historiographie de la période 1945-1975. L'histoire du secret nucléaire en France et en Suède n'a jusqu'à présent jamais été abordée de manière systématique, et elle n'a été abordée directement que pour une période plus tardive dans le cas britannique. Basée sur des sources primaires, parfois inexploitées, provenant des trois pays, cette thèse fournit le premier compte-rendu du développement des régimes de secret nucléaire et de leurs conséquences sur le gouvernement démocratique dans les trois pays. Le travail proposé ici nuance notre compréhension de la période d'après-guerre comme étant "l'âge démocratique de l'Europe occidentale".[19] En France, la période 1945-1975 est considérée comme les "Trente Glorieuses" et comme une longue période de croissance économique de trois décennies. Mais, comme l'a noté Benoît Pelopidas, la fin des années 50 et les années 60 ont également été une période où l'espace des futurs politiques possibles s'est réduit, faisant des armes nucléaires des éléments "éternels" de l'avenir de l'humanité.[20] Il s'agit également, selon moi, d'une période de restrictions démocratiques, au cours de laquelle les États français, britannique et suédois ont connu des formes sans précédent de restriction du contrôle démocratique.[21] La notion de "deuxième vague de démocratisation" ne tient pas compte du fait qu'en même temps que la démocratie se développait quantitativement, elle se réduisait qualitativement à mesure que des restrictions apparaissaient chez les partisans de l'armement nucléaire. [22]

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[16] Par exemple Dahl, *Democracy and Its Critics*, 14–15, 67–70.
[17] Gusterson, *Nuclear Rites*; Masco, “Lie Detectors: On Secrets and Hypersecurity in Los Alamos”; Krige, *Sharing Knowledge, Shaping Europe*; Kampani, *India's Nuclear Proliferation Policy*; Salisbury, *Secrecy, Public Relations and the British Nuclear Debate*; Wellerstein, *Restricted Data*.
[18] L'exception ici est le livre d'Avner Cohen sur la politique israélienne d'*amimut* (ambiguïté), dans lequel il aborde directement la question du secret, de la démocratie et des armes nucléaires. Cohen, *Worst-Kept Secret*.
[19] Conway, *Western Europe's Democratic Age, 1945-1968*.
[20] Pelopidas, “The Birth of Nuclear Eternity.”
[21] Il convient de noter qu'une réévaluation similaire de la période a déjà été effectuée, en se concentrant sur la pollution et les critiques de la modernisation, dans Pessis, Topçu, and Bonneuil, *Une Autre Histoire Des “Trente Glorieuses.”*
[22] La déclaration classique sur la deuxième vague de démocratisation étant Huntington, *The Third Wave*.

Enfin, en soulignant les coûts démocratiques de la nucléarisation, ces résultats abordent également une forme clé de vulnérabilité que Benoît Pelopidas appelle "vulnérabilité épistémique" - une situation dans laquelle une personne est tentée d'accepter comme vrai ce qui ne peut pas, ou n'a pas été prouvé.[23] Cela a des implications pour les débats actuels sur la modernisation ou l'abolition des armes nucléaires. Les États actuellement dotés de l'arme nucléaire sont tous engagés dans des programmes de modernisation nucléaire à long terme visant à perpétuer leurs arsenaux pendant plusieurs décennies, tandis que le démantèlement de l'arsenal actuel pourrait prendre jusqu'à dix ans. Dans ce contexte, il est opportun d'évaluer l'impact des armes nucléaires sous toutes leurs formes afin que les débats puissent s'appuyer sur une bonne compréhension des conséquences. Plus important encore, les implications des programmes de modernisation pour les États démocratiques ne sont pas les mêmes si nous supposons qu'ils n'ont pas d'effets politiques sur les gouvernements démocratiques ou si nous savons qu'ils ont un coût démocratique. L'idéologie dominante de l'ordre nucléaire attire l'attention principalement sur la prolifération horizontale et les menaces potentielles pour la stabilité stratégique, rendant la reconstruction continue des arsenaux nucléaires existants largement invisible.[24] Mais ce n'est pas exact. En soutenant que les armes nucléaires ont un impact direct sur la nature du gouvernement démocratique, je montre que la modernisation nucléaire n'est pas seulement un choix stratégique, mais qu'elle a également un impact sur le système politique qu'elles sont censées défendre.

Méthodes : une démonstration parallèle de la nucléarisation dans les États démocratiques européens

Pour étayer mon argumentation, j'ai choisi de m'appuyer sur les méthodes de démonstration parallèle en me basant sur trois études de cas historiques qualitatives : le programme nucléaire britannique (de 1945 à 1958), le programme nucléaire suédois (de 1947 à 1972) et le programme nucléaire français (de 1954 à 1974). Les méthodes de démonstration parallèle, selon Skocpol et Somers, visent à "persuader (...) qu'une hypothèse ou une théorie donnée, explicitement délimitée, peut démontrer de manière répétée sa fécondité - sa capacité à ordonner les preuves de manière convaincante - lorsqu'elle est appliquée à une série de trajectoires historiques pertinentes".[25] J'ai étudié ces cas sur la base de sources primaires, collectées dans neuf archives différentes au Royaume-Uni, en France et en Suède.[26]

La périodisation des cas les suit depuis le début de leur programme nucléaire jusqu'à la fin du développement de la première génération d'armes nucléaires - ou jusqu'au point de renoncement à un tel développement - et jusqu'à la fin des programmes d'essais atmosphériques. Ma principale variable étant la technologie nucléaire elle-même, j'ai défini les limites de mes cas en fonction de l'évolution technologique et non politique. Dans chaque cas, je retrace les origines des régimes de secret nucléaire, leur développement et leurs effets sur les modes de contrôle démocratique.

J'ai sélectionné ces trois cas sur la base de leurs similitudes et de leurs différences. Ces cas sont similaires en ce sens qu'ils partagent un mode de gouvernement similaire - ce sont tous les trois des États démocratiques libéraux -, qu'ils ont évolué dans un environnement de sécurité similaire - la guerre froide

[23] Pelopidas, *Repenser Les Choix Nucléaires. La Séduction de l'impossible*, 183.
[24] Egeland, "The Ideology of Nuclear Order."
[25] Skocpol and Somers, "The Uses of Comparative History in Macrosocial Inquiry," 176.
[26] Les Archives Nationales (Kew, UK), le Service Historique de la Défense (Vincennes, France), les Archives Nationales (Pierrefitte-sur-Seine, France), les Archives de l'Observatoire des Armements (Lyon, France), le Centre Historique de Sciences Po (Paris, France), le Musée Curie (Paris, France), le Riksarkiv (Marieberg, Suède), le Krigsarkiv (Arninge, Suède), et le Arbetarrörelsens Arkiv (Huddinge, Suède). J'ai également utilisé les archives numériques des National Security Archives (nsarchive.gwu.edu), du Wilson Center (digitalarchive.wilsoncenter.org), des National Archives of Australia (naa.gov.au) et du site web Mémoires des hommes (memoiredeshommes.sga.defense.gouv.fr).

européenne - et qu'ils se sont engagés dans la recherche d'armes nucléaires au cours de la même période. Ils partagent également des différences intéressantes pour mon analyse. Tout d'abord, la sélection permet une variation de ma première variable - la technologie - puisque la Suède offre un cas de renonciation aux armes nucléaires tandis que la France et le Royaume-Uni offrent des cas d'acquisition. Cela me permet de vérifier si la nucléarisation s'arrête lorsque les États abandonnent leur ambition nucléaire, ou s'il existe une forme d'hystérésis. Deuxièmement, les États de l'échantillon ont tous des relations différentes avec les États-Unis et sont donc susceptibles d'être soumis à différents niveaux de pressions diplomatiques, ce qui me permet de vérifier si cela fonctionne ou non comme une forme de contrainte. Enfin, bien qu'ils soient tous des démocraties libérales, ils ont des systèmes constitutionnels différents, ainsi que des pratiques différentes en matière de secret.

Il convient de noter que cette thèse se concentre uniquement sur les *armes* nucléaires. Par conséquent, tout au long de cette thèse, j'utiliserai les termes "programme nucléaire" ou "secret nucléaire" pour me référer spécifiquement à la politique des armes nucléaires. Les programmes d'énergie nucléaire ne seront évoqués que dans la mesure où ils étaient liés à la recherche militaire. Toutefois, il serait intéressant d'appliquer un cadre similaire non pas à la technologie des *armes* nucléaires en particulier, mais à la technologie nucléaire en général, et d'évaluer si la nucléarisation a également lieu lorsqu'un pays cherche à acquérir des réacteurs nucléaires.

Résumé des chapitres

Cette thèse est organisée en cinq chapitres. Dans le premier chapitre, je présente mon argumentation théorique. Sur la base d'un examen critique des travaux existants sur les armes nucléaires et les États démocratiques, je montre que les chercheurs n'ont pas saisi les effets de la nucléarisation sur les structures étatiques et, par conséquent, n'ont pas répondu à la question de savoir comment et pourquoi les armes nucléaires affectent les gouvernements démocratiques. Je propose un nouveau cadre théorique qui, en se concentrant sur les régimes de secret nucléaire en tant que produits de la capacité d'action de la technologie, aide à démontrer les effets de la nucléarisation sur la capacité du public à contrôler les actions de l'État. Je soutiens que la nucléarisation produit des démocraties restreintes, des États qui satisfont à la plupart des critères de la démocratie mais où la partie la plus essentielle des actions de l'État reste hors de leur contrôle.

Dans les chapitres suivants, je fournis des preuves de mon argumentation, tirées des trois études de cas empiriques présentées dans l'introduction. Dans le chapitre 2, je me penche sur les origines du secret nucléaire au cours de la période 1939-1946, lorsque les armes nucléaires ont été inventées et perpétuées par la suite. Je cherche à établir comment les propriétés intrinsèques des armes nucléaires ont conduit au choix du secret comme solution pour la sécurité contre les armes nucléaires dans un monde anarchique. Je montre que l'invention des armes nucléaires a lié la recherche nucléaire aux préoccupations en matière de sécurité, créant un besoin de secret sur la recherche nucléaire qui n'existait pas autrement. Cela implique que la technologie a des effets causaux. Cependant, je soutiens que ces effets causaux n'ont pas été déterminés uniquement par la technologie, mais aussi par leur contexte : les implications des armes nucléaires en matière de sécurité auraient pu être traitées différemment, notamment par un contrôle international de l'énergie atomique. La raison pour laquelle cette solution n'a pas été adoptée n'est pas qu'elle était matériellement *impossible*, mais qu'elle était politiquement *indésirable*. Dans ce contexte spécifique, la technopolitique des armes nucléaires a créé un besoin pour les États d'utiliser le secret pour faire face à leurs implications en matière de sécurité. Elle a établi un impératif de secret pour la sécurité dans un monde doté d'armes nucléaires.

Pour ce faire, je me penche sur trois moments critiques de l'histoire des armes nucléaires : la découverte de la fission nucléaire, parfois considérée comme le début de l'histoire du secret nucléaire, le moment

du rapport britannique MAUD qui a établi avec un haut niveau de certitude la possibilité de créer des armes nucléaires, et la période de l'immédiat après-guerre, lorsque les plans pour le contrôle international de l'atome ont été discutés. Je montre que, contrairement à ce que certains ont écrit, la découverte de la fission n'a pas donné le coup d'envoi d'un impératif de secret pour les acteurs. En fait, comme la plupart des personnes impliquées dans la recherche sur la fission pensaient qu'une bombe nucléaire était impossible ou qu'elle n'arriverait pas avant des décennies, peu d'entre elles ont ressenti le besoin d'entourer la science nucléaire de secret. Ce n'est que lorsque le rapport MAUD, un rapport britannique secret sur la possibilité de fabriquer des bombes atomiques, a confirmé les implications de la fission nucléaire en termes de sécurité que le rideau du secret est tombé. Ayant appris qu'une bombe d'une puissance considérable pouvait effectivement être fabriquée dans un délai raisonnable, les acteurs se sont sentis obligés d'agir pour empêcher les adversaires - en premier lieu les nazis - de s'en doter. À la fin de la guerre, lorsque le secret de la bombe a été révélé à tous, les acteurs se sont trouvés face à un choix : un régime de contrôle international capable d'offrir une sécurité contre les armes nucléaires ou compter sur les arrangements nationaux en matière de secret comme solution de sécurité. En un mot, ils devaient choisir entre refaire le monde ou refaire l'État. Pour des raisons contingentes, le contrôle international a échoué, ce qui a conduit les responsables politiques américains à décider que les mesures de secret prises en temps de guerre devaient être maintenues - indéfiniment - en temps de paix. En faisant ce choix, ils ont fait du secret un impératif mondial.

Dans le troisième chapitre, je me penche plus particulièrement sur les trois études de cas et montre comment, lorsque ces États ont lancé leurs programmes nucléaires respectifs, l'impératif du secret a pesé sur les fonctionnaires et justifié leur choix de créer des régimes spécifiques de contrôle de l'information. Les cas britannique, suédois et français ont suivi des voies différentes pour aboutir à un résultat similaire. Au Royaume-Uni, où le programme nucléaire a été rapidement décidé après la guerre, l'impératif technologique a été combiné à une forte contrainte venant des États-Unis. Participant au projet Manhattan, l'État britannique était conscient que les connaissances qu'il avait acquises pendant la guerre avaient de sérieuses implications en matière de sécurité. Peu d'acteurs ont débattu de la pertinence du secret en matière d'armes nucléaires, bien que beaucoup aient affirmé qu'un régime de secret fort n'était pas souhaitable. Lorsqu'en 1947, le projet a pris une orientation militaire, les décideurs britanniques ont été confrontés à deux problèmes. D'une part, ils souhaitaient coopérer plus étroitement avec les États-Unis, dont les responsables affirmaient qu'ils ne le feraient que si le régime de secret britannique s'avérait suffisamment rigoureux. D'autre part, ils voulaient éviter la confrontation et le débat sur le programme nucléaire dans un État où il n'y avait pas de consensus. Pour résoudre ces deux problèmes, les responsables britanniques ont décidé d'exacerber les régimes de secret, en décidant de cacher non seulement le contenu de la politique nucléaire, mais aussi son objectif.

En Suède, qui ne s'est pas engagée dans la recherche nucléaire pendant la guerre, le secret a été moins problématique lorsque l'intérêt pour l'énergie atomique s'est accru à la fin de l'année 1945. Pendant un certain temps, de nombreux scientifiques se sont principalement opposés au secret sur la recherche nucléaire - jusqu'à ce qu'ils réalisent les implications en termes de sécurité. Lorsqu'il est devenu évident que leurs recherches, même civiles, pouvaient conduire à la production d'armes nucléaires, le secret est devenu un impératif. En 1947, la recherche nucléaire suédoise est devenue confidentielle. Cette situation ne fera que se durcir au fur et à mesure que la Suède s'engagera dans une coopération avec les États-Unis. Désireux de ne pas être exclus du marché européen dominé par les États-Unis, les responsables de la Suède neutre ont cédé aux pressions diplomatiques américaines. En conséquence, ils ont mis en place des règles de contrôle des exportations de technologies nucléaires et ont ressenti le besoin de renforcer les mesures de secret autour des centres de recherche nucléaire. En 1949, lorsque la recherche

sur les armes nucléaires a été officiellement inscrite à l'ordre du jour de la FOA, le secret était tel que le public n'en entendait pas parler.

Qu'en est-il de la France ? Là, le secret a mis plus de temps à s'installer. Pendant quelques années, de 1945 au début des années 50, le CEA a résisté à l'impératif du secret. Conscient de l'importance de la maîtrise de l'information, notamment pour la préservation de l'invention industrielle, le CEA refuse néanmoins de s'engager trop avant dans la pratique du secret, arguant du fait qu'il ne fait pas de recherche militaire. Peu intéressé par la coopération technologique avec les Etats-Unis, il n'éprouve guère le besoin de réagir aux pressions diplomatiques constantes. Mais au fil du temps, la pression s'est faite plus forte. Il devient difficile d'ignorer les implications de la recherche nucléaire en matière de sécurité et les pressions américaines s'intensifient. La politique du CEA change avec l'arrivée d'un nouvel administrateur, Pierre Guillaumat. Guillaumat est favorable au secret, non seulement parce qu'il comprend les risques d'espionnage et de fuites, mais aussi parce qu'il souhaite que la France ait un programme d'armement nucléaire et craint que l'opinion publique n'y soit pas favorable. Aidé par un pouvoir politique effrayé par un tel débat, Guillaumat a choisi d'entourer de secret non seulement le contenu de la politique nucléaire de la France, mais aussi sa finalité.

Pour chacun des trois cas, je montre que la décision de créer des régimes de secret nucléaire était principalement, mais pas uniquement, justifiée par des préoccupations de sécurité. Les pressions diplomatiques exercées par les États-Unis et les préoccupations nationales liées aux protestations contre la décision d'acquérir des armes nucléaires ont également joué un rôle dans la définition des limites du secret. Les limites minimales du secret, la *raison d'être* du régime de secret nucléaire, découlent des contraintes matérielles des armes nucléaires, mais leurs limites maximales sont définies par des facteurs politiques.

Après avoir établi que les changements dans les structures de l'État, sous la forme de l'apparition de régimes de secret nucléaire, peuvent être attribués à la technopolitique des armes nucléaires, je me tourne vers une analyse des implications démocratiques de ces régimes. Dans le chapitre 4, j'étudie comment le contrôle législatif sur l'élaboration de la politique nucléaire a été rendu inefficace par le secret, les députés étant constamment dans l'incapacité d'obtenir des informations précises sur les choix politiques passés, futurs et présents. Selon moi, cette situation est le résultat de différents mécanismes issus des régimes de secret qui ont soit exclu le public des procédures de prise de décision, soit déformé les informations qui lui ont été communiquées, soit facilité le déni et l'aveuglement auto-infligé sur les questions nucléaires. En étudiant l'élaboration de la politique nucléaire au Royaume-Uni, en France et en Suède pendant la période où le programme était "clandestin" et la période où il est officiellement reconnu, je montre que le secret empêche un contrôle efficace des différents niveaux de la politique. Pendant la période de clandestinité, les députés n'avaient aucun contrôle sur aucun niveau de politique, étant exclus de toutes les formes de prise de décision. Lorsque les programmes ont été reconnus, les couches épaisses de secret entourant la politique nucléaire ont continué à empêcher les députés d'exercer un contrôle à la fois sur la politique d'action (les plans de déploiement et d'utilisation de l'arsenal nucléaire) et sur la politique de développement des forces (les choix d'acquisition et de développement liés à l'arsenal). En France, comme au Royaume-Uni, les pratiques d'obscurcissement se sont poursuivies, la sécurité étant invoquée pour empêcher les députés d'acquérir des connaissances réelles sur les choix politiques. En Suède, où le programme a été progressivement abandonné au début des années 60, le maintien du secret sur la recherche nucléaire - justifié par les implications de ces activités en termes de sécurité - a permis à certains responsables d'envisager la possibilité de poursuivre la fabrication d'armes nucléaires. En fait, ce n'est que dans les années 1990 que l'étendue de la recherche nucléaire en Suède a été révélée publiquement, ce qui montre la nature hystérétique du secret nucléaire - même après la fin du programme, le secret persiste car les contraintes persistent.

Dans le chapitre 5, je me penche sur le problème des dommages nucléaires et des risques de dommages en étudiant spécifiquement le problème du secret entourant les essais nucléaires atmosphériques. Je montre comment le secret a rendu inefficaces les mécanismes de délibération, de surveillance et de responsabilité en ce qui concerne les sites d'essais nucléaires et montre que le secret a permis aux responsables britanniques et français d'effectuer des essais nucléaires et d'exposer de manière répétée leur population à des dommages et à des risques de dommages sans aucune forme de contrôle public. Je soutiens que cette dissimulation a été rendue possible par la nécessité de protéger les "secrets stratégiques" de l'arsenal nucléaire des pays, c'est-à-dire les données techniques relatives aux dispositifs testés. Cela a conduit à l'émergence de régimes de secret très stricts qui ont offert aux acteurs la possibilité de dissimuler les "sombres secrets" de la contamination radioactive. Non seulement la délibération a été faussée, car le public était mal informé des risques, mais le contrôle a également été rendu impossible par le fait que seuls des acteurs sélectionnés ayant un intérêt direct pouvaient acquérir des connaissances sur la contamination radioactive. En outre, l'instauration d'un monopole d'État sur la production de données relatives aux retombées radioactives a non seulement permis aux fonctionnaires de l'État de dissimuler ces données, mais aussi de biaiser leur collecte, ce qui a entraîné des lacunes dans la collecte des données et des déficits de responsabilité. En conséquence, les fonctionnaires ont échappé à la responsabilité des dommages nucléaires qu'ils ont causés. Cela montre, selon moi, que les exigences du secret nucléaire rendent les États démocratiques très vulnérables tout en offrant aux fonctionnaires des pouvoirs de facto qu'ils n'auraient pas possédés autrement.

J'en conclus que le processus de nucléarisation a structurellement restreint le contrôle démocratique sur les actions de l'État, ce qui justifie l'affirmation selon laquelle la nucléarisation limite la capacité des citoyens des États nucléaires à se gouverner eux-mêmes. Pour étayer mon propos, je mène dans la conclusion une étude de plausibilité sur d'autres cas de démocraties dotées de l'arme nucléaire et je montre que des schémas similaires peuvent être trouvés. À partir de là, je propose différentes pistes de recherche pour l'avenir.